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A PERIODICAL OF SCHOOL ADMINISTRATION

Devoted to the Interests of School Boards, Superintendents,
School Business Officials, and School Architects

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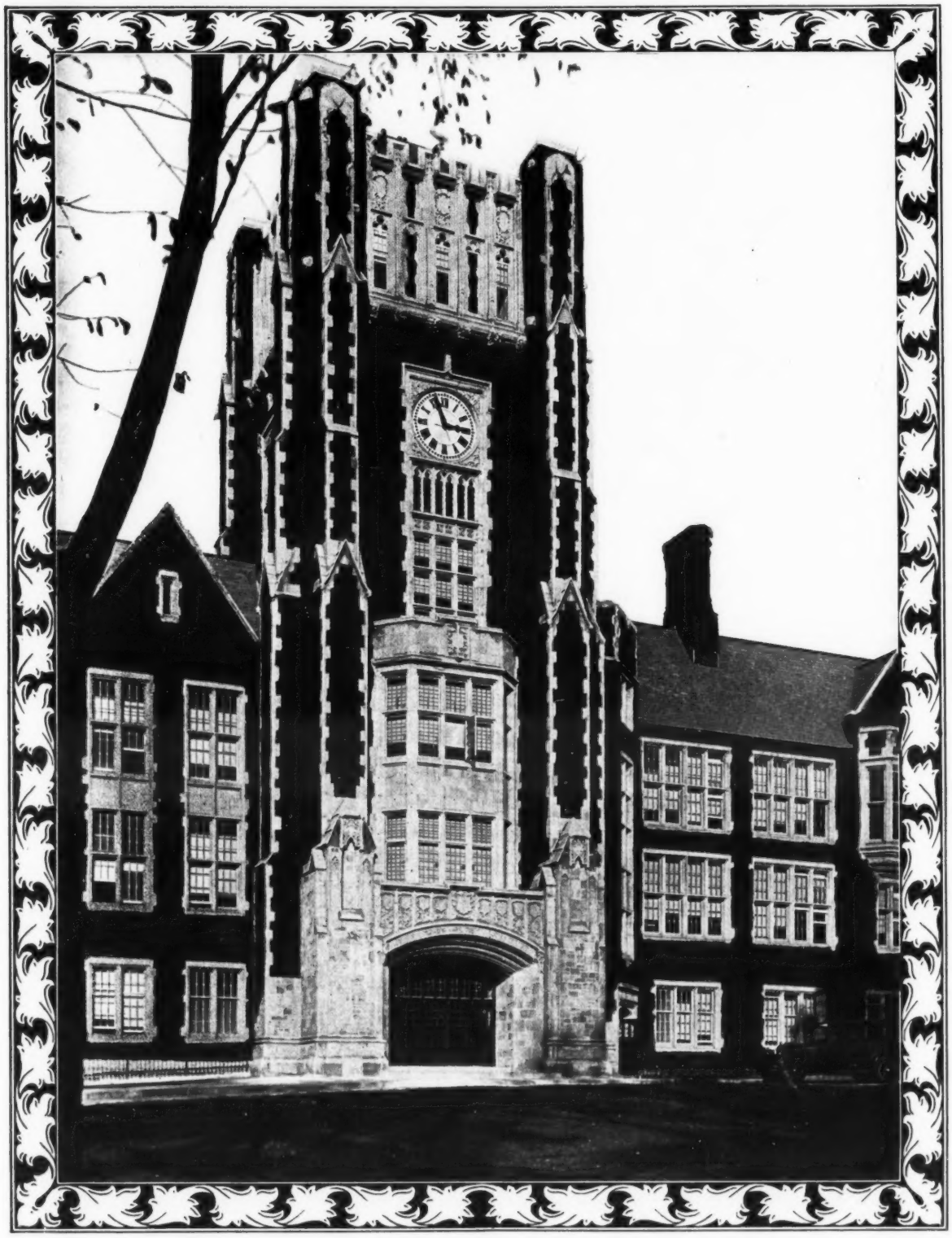

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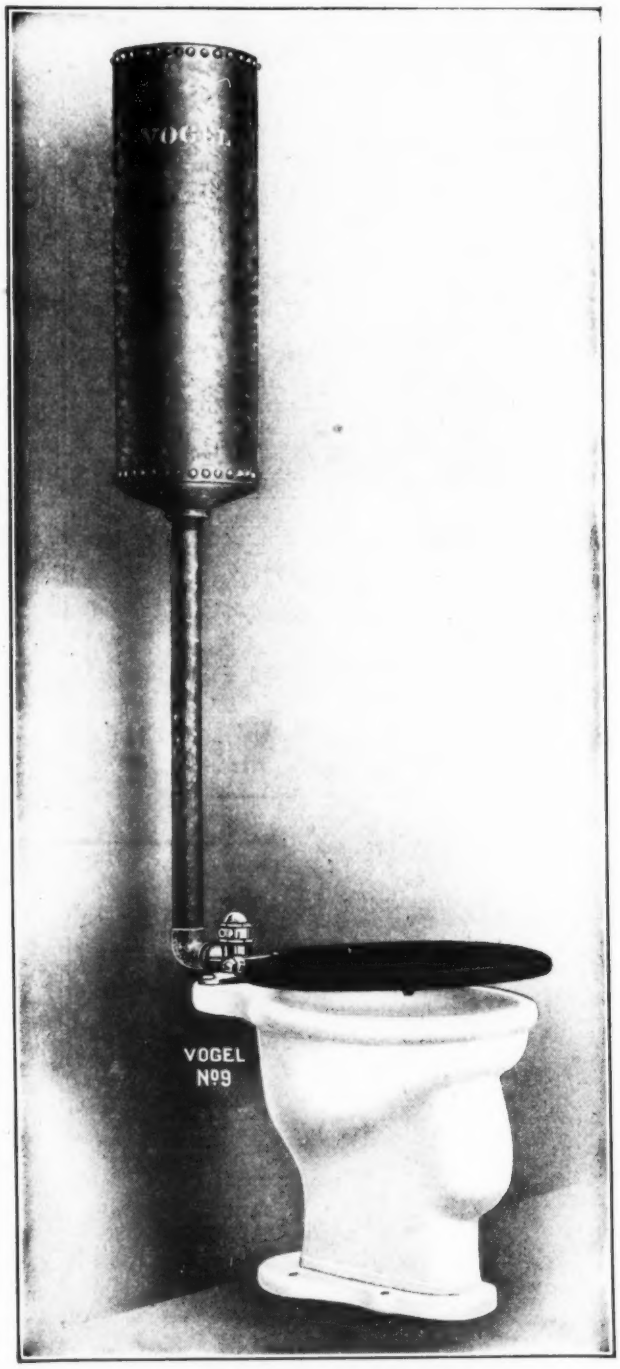

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Abbreviations: (Ed.), Editorials; (N.), News Items

	Month	Page
A		
Abolishing School-Board Committees, (N.)	March	78
Abolition of Standing Committees, The, (Ed.)	March	66
Achievement in School Construction, An, Virgil L. Johnson	Jan.	60
Administrative Policies of the Board of Education of Wilson, Okla.	March	68
Are Certified Checks an Essential in School Contract Bidding? (Ed.)	May	69
Are School Textbooks Well Made? (Ed.)	May	69
Are the Teachers Suffering from School-Board Blue Laws, (Ed.).	June	69
Atlanta Uses Novel Plan to Review Standardized Plans for Elementary Schools, H. Reid Hunter	Feb.	38
B		
Back-Seat School Driver, The, (N.)	Feb.	140
Bancroft School, Auburn, Mass., The	Jan.	42
BARNHILL, O. H.—How Los Angeles Builds Schools	Jan.	73
Barton School, Philadelphia, Pa., The	Jan.	64
BENDER, JOHN F.—Criticisms of Attendance Laws	Feb.	43
BENNETT, ERNEST—The Qualifications of Teachers	May	65
Bergenfield School, The	April	62
BETELLE, JAMES O.—The Superintendent of Schools and the New School Building	Jan.	39
Better Budget for Summer Repairs of Schoolhouses, Edwin S. Hallett	June	56
Better Teaching in the High Schools of New York City, (N.)	Jan.	128
BLACK, CHARLES—Then and Now in School Finance	Jan.	101
BROWN, CHARLES H.—Some Fundamentals of College and University Library Buildings	June	79
BRYANT, MRS. B. H.—The Medford Continuous Census	May	54
Budgeting and Classification of School Funds, (N.)	March	96
Budgeting in the Small School, Lynn E. Castle	June	55
Budgeting of School Supplies, (N.)	April	100
Building a Chinese Wall Around Teacher Service, (Ed.)	Feb.	70
Bulletin on School Supervision, A, Glenn K. Kelly, (N.)	Feb.	84
Bureau of Education Urges Revision of Salary Schedules, (N.)	May	130
BURR, SAMUEL E.—The Organization of a Public-School Staff	June	49
BURR, SAMUEL E.—Providing a Home for the Lynn School Officials	April	42
BUTLER, CHARLES—School-Building Competitions	Jan.	41
C		
California School Business Officials Form Organization, (N.)	May	146
Cardinal School Pests, Fred J. Ward	March	47
CARROLL, CHARLES—Educating a Superintendent of Schools	March	41
Certification for Improving Professional Leadership, J. Cayce Morrison	May	49
CASTLE, LYNN E.—Budgeting in the Small School	June	55
CHALLMAN, SAMUEL A.—Corridor Ventilation	Jan.	45
Child Accounting: Its Achievements and Problems, Arthur B. Moehlman	Feb.	53
CLARK, HAROLD F.—Index of School-Bond Prices	Jan.	185
CLARK, HAROLD F.—Index of School-Bond Prices	Feb.	123
CLARK, HAROLD F.—Index of School-Bond Prices	March	64
CLARK, HAROLD F.—Index of School-Bond Prices	April	65
CLARK, HAROLD F.—Index of School-Bond Prices	May	67
CLARK, HAROLD F.—Index of School-Bond Prices	June	67
Cleveland Salary Schedule for Principals, The, (N.)	Jan.	132
Clifton Avenue School, Lakewood, N. J., The	Jan.	56
Columbia High School, South Orange, N. J., The	Jan.	52
Comparison of Objective Examinations in American History, A, D. H. Martin	April	49
Consolidation and Transportation in North Carolina (N.)	April	124
Constitutional and Legal Basis of Transporting Pupils To and From School, The, Glenn K. Kelly	Feb.	51
Control of Light in Classrooms, The, Lawrence Louthian	Jan.	77
Coventry School, Cleveland Heights, Ohio	Jan.	77
Conwell School, Philadelphia, Pa	Jan.	63
Cooperation Between School Officials and Employees	Feb.	50
Corridor Ventilation, Samuel A. Challman	Jan.	45
Cost of Education in the United States, (N.)	March	96
Cost of Operating Swimming Pools, The (N.)	Jan.	113
Cost-Plus System of Letting Contracts for Schools, The, Warren S. Holmes	Jan.	75
Criticisms of Attendance Laws, John F. Bender	Feb.	43
Crosby High School, Belfast, Me.	June	64
Current Use of Teachers' Application Blanks, John F. Nietz	March	55
D		
Decalog for School-Board Members, A, Stanley L. Wozniak	March	39
Dehorning a Dilemma: The Troy Plan of Financing School Construction, Isaac Doughton	April	46
Department of Superintendence at Boston, The	April	52
Detroit Test at Oakland, Calif., The	April	106
Development of a Building Program in a Rapidly Growing Community, W. R. McCornack	Jan.	78
DE WITT R. P.—Texas School Buildings of Note	March	57
DICKERMAN, H. E.—The Selection of High-School Textbooks	Feb.	90
Distinction Between Classrooms and Academic Rooms, Clarence D. Kingsley	June	44
Dobyns-Bennett High School, Kingsport, Tenn	May	60
Do the Schools Receive the Best Architecture? (Ed.)	May	69
DOUGHTON, ISAAC—Dehorning a Dilemma: The Troy Plan of Financing School Construction	April	46
DRISKILL, WILLIE H.—Two Changes at Birmingham, Ala	June	130
DUFFIELD, THOMAS—School Ventilation Studies of the New York Commission on Ventilation	Jan.	57
Dynamite the Stopwatch Used in Schools, Garry C. Myers	June	40
E		
Economic Factors Related to School-Population Growth, Fred Engelhardt and N. H. Hegel	May	52
Economic Stability and School Costs (N.)	May	149
Economy and Efficiency as Factors in the Business Management of the Sacramento Schools, (N.)	Jan.	104
Educating a Superintendent of Schools, Charles Carroll	March	41
Educational Consultant in School Architecture, (Ed.)	April	67
Educational Leave for Teachers in Washington (N.)	March	130
Efficient Expenditure of School Moneys F. M. Hunter	May	43
Election of School-Board Presidents and Superintendents	June	52
Elective School Boards in Favor, (N.)	June	125
Endemic Goiter Among School Children, (N.)	Feb.	108
Enforcing School-Attendance Laws	March	68
ENGELHARDT, FRED—Economic Factors Related to School-Population Growth	May	52
Equitable Taxation and Adequate School Support, (Ed.)	March	66
Establish Department of Research at Denver, (N.)	March	70
Eureka Plan in Sacramento, Calif., The	Feb.	84
Evolution in School Administrative Practice	April	38
Examinations: What They Stand For, Janet C. MacDonald	April	132
F		
Factors Determining the Size of a High-School Building, James M. Turner	Jan.	46
Fairfax School, Cleveland Heights, Ohio, The	Jan.	82
FEARON, J. E.—What Teachers Want in School Buildings	Jan.	76
Fire Drills in Cincinnati, (N.)	March	142
Fire Insurance at Easton, Pa., (N.)	March	127
Fordson High School, The	June	59
Fort Lee Junior-Senior High School, The	April	63
Fort Wayne Salary Schedule, The, (N.)	June	146
From Fraternities to Clubs, J. Andre Wadhams	March	51
Functions and Relations of the Superintendent and the School Board, The, E. O. Shaw	June	51
Functions of the Elementary Principal, The, Clarence R. Stone	May	54
Functions of the School Superintendent in Theory and Practice, Cecil L. Hughes	Feb.	45
Functions of the School Superintendent in Theory and Practice, Cecil L. Hughes	April	55
Functions of the School Superintendent in Theory and Practice, Cecil L. Hughes	May	70
Functions of the School Superintendent in Theory and Practice, Cecil L. Hughes	June	70
G		
Gardena School, Los Angeles, The	Jan.	73
Georgia's Plan for Distribution of Her Equalization School Fund.	March	40
GIESE, WILLIAM G.—The High-School Library	Jan.	74
Glenside School, Reading, Pa., The	Feb.	62
GOMPERT, WILLIAM H.—Schedule of Standardized Rooms in Academic High Schools, New York City	Jan.	190
GOODIER, F. T.—Sick Leave for Teachers	May	44
Graduation Exercises and Their Value to the Community, (Ed.)	April	67
GUIWITS, EMILY—Nebraska Association of School Boards and Executives	March	54
H		
HALLETT, EDWIN S.—A Better Budget for Summer Repairs	June	56
HARRIS, G. L.—How New York City Handles the Teachers' Payroll Records	June	74
Harris-Elmore School, Elmore, Ohio	June	63
Harris High School, Harrisburg, Pa., The	Jan.	84
Harris School, Springfield, Mass., The	Jan.	44
HARTMAN, FRANK E.—Purification of Water With Reference to Swimming Pools	May	55
HARTMAN, FRANK E.—The Purification of Water in Swimming Pools	June	53
HATCH, JAMES N.—Los Angeles Safety Traffic Tunnels	Feb.	42
Have Teachers a Right to Go on a Strike? (Ed.)	Feb.	70
HEGEL, N. H.—Economic Factors Related to School-Population Growth	May	52
Henderson School, Cameron, Tex., The	March	63
Hibberd School, Richmond, Ind., The	May	63
Hick Superintendent at Boston, The	April	68
High Points in School Administrative Service, (Ed.)	April	66
High Quality in Small Schoolhouses	Jan.	43
High-School Library, The, William G. Giese	Jan.	74
HINES, HARLAN C.—Let the Cry for Men Be Articulate	May	41
HIRSCH, EVERETT C.—Superintendent of Schools in a City of Five Thousand	Feb.	55
HIRST, C. M.—School Building in Arkansas	Jan.	88
Holding Power of the Schools of Washington, (N.)	March	134
HOLMES, WARREN S.—Making the School Building Educate	June	47
HOLMES, WARREN S.—The Cost-Plus System of Letting Contracts	Jan.	75
How a School-Bond Issue Was Won, (N.)	June	90
How Los Angeles Builds Schools, O. H. Barnhill	Jan.	73
How McKeesport Staged a Bond Campaign, (N.)	Jan.	156
How New York City Handles the Teachers' Payroll Records, G. L. Harris	June	74
HUGHES, CECIL L.—The Functions of the School Superintendent in Theory and Practice	Feb.	45
HUGHES, CECIL L.—The Functions of the School Superintendent in Theory and Practice	April	55
HUGHES, CECIL L.—The Functions of the School Superintendent in Theory and Practice	May	70
HUGHES, CECIL L.—Functions of the School Superintendent in Theory and Practice	June	70
HUNTER, F. M.—Efficient Expenditure of School Moneys	May	43
HUNTER, H. REID—Atlanta Uses Novel Plan to Review Standardized Plans for Elementary Schools	Feb.	38
HUTCHINGS, EMILY G.—William Ittner's Suburban Schools Around St. Louis	Jan.	48
I		
Indebtedness of North Carolina Schools, The, (N.)	June	112
Index of School-Bond Prices, Harold F. Clark	Jan.	185
Index of School-Bond Prices, Harold F. Clark	Feb.	123
Index of School-Bond Prices, Harold F. Clark	March	64
Index of School-Bond Prices, Harold F. Clark	April	65
Index of School-Bond Prices, Harold F. Clark	May	67
Index of School-Bond Prices, Harold F. Clark	June	67
J		
Janitors' Short Course in Kansas Teachers' College, (N.)	May	106
JOHNSON, VIRGIL L.—An Achievement in School Construction.	Jan.	60
JOLLEY, GEORGE—Some Outstanding Policies of the Board of Education at Wilson, Okla	May	40
JOLLIEF, JOHN H.—Salesmanship From a School Buyer's Viewpoint	Feb.	69
Just a Moment, Mr. Superintendent	Feb.	72
K		
KELLER, PAUL G. W.—Saving Space by Tote Boxes	June	80
Keeping School-Board Members Informed, M. C. White	May	72
Keeping School Expenditures Within the Appropriations, Wilbert C. Wehn	April	94
KELLY, GLENN K.—The Constitutional and Legal Basis of Transporting Pupils To and From School	Feb.	51
KEYWORTH, M. R.—The New Michigan School Code	April	44
KINGSLEY, CLARENCE D.—Distinction Between Classrooms and Acadamic Rooms	June	44
L		
Landscape Development of School Grounds, M. Walter Pesman	Feb.	47
Landscape Development of School Grounds, M. Walter Pesman	May	45
Length of the Junior-High-School Day, The, (N.)	June	136
Length of the School Term in North Carolina, (N.)	May	96
Leominster Rules Governing Janitors, (N.)	March	84
Let the Cry for Men Be Articulate, Harlan C. Hines	May	41
Library Standards for Schools, (N.)	April	97
LIGHTY, KENT—Protecting the School Playground	March	44
LIGHTY, KENT—Protecting the School Playground	April	50
Lincoln Junior High School, Rockford, Ill.	May	57
Little Schools for Little People, Gabrielle E. Sibley	April	57
Location of School Sites in Growing Cities, (Ed.)	April	66
LOCKHART, A. V.—The Present Teacher Surplus	May	40
Los Angeles Safety Traffic Tunnels, James N. Hatch	Feb.	42
Louisiana Parish School Board, A, W. H. Perkins	May	47
LOUTHIAN, LAWRENCE—The Control of Light in Classrooms	Jan.	77
M		
MAC DONALD, JANET C.—Examinations: What They Stand For	April	132
Making the School Building Educate, Warren S. Holmes	June	47
MARSHALL, G. H.—Superintendent and the Applicant	May	51
MARTIN, D. H.—A Comparison of Objective Examinations in American History	April	49
Massapequa School, The	April	60
Major Problems in School Administration, Charles L. Spain	June	92
McCORNACK, W. R.—Development of a Building Program in a Rapidly Growing Community	Jan.	78
Medford Continuous Census, The, Mrs. B. H. Bryant	May	54
Mexia High School, Mexia, Tex.	March	61
MEYERS, C. W.—School Boards and Superintendents	Feb.	42
MILLER, J. W.—The Problem of Flooring in Schoolhouses	Jan.	136
Millmont School, Reading, Pa., The	Feb.	63
Milwaukee Principals' Salary Schedule, The, (N.)	April	90
Mission of the Modern School Architect, The, (Ed.)	Jan.	90
Modern Means and Types of School Publicity, (Ed.)	Jan.	91

	Month	Page
MOEHLMAN, ARTHUR B.—Child Accounting: Its Achievements and Problems	Feb.	53
More Light on the Subject of School Taxation, (Ed.)	April	66
MORRISON, J. CAYCE—Certification for Improving Professional Leadership	May	49
MYERS, GARRY C.—Dynamite the Stopwatch Used in Schools..	June	40
N		
Nebraska Association of School Boards and Executives, Emily Guiwits	March	54
New Michigan School Code, The, (N.)	March	77
New Michigan School Code, The, M. R. Keyworth	April	44
New Salary Schedule at Harrisburg, Pa., (N.)	June	133
New York City Administrators' Salary Schedule, (N.)	Feb.	118
New York City Board of Education Adopts Rating System for School Custodians, (N.)	Feb.	132
New York City Rules for Computing Custodial Compensation, (N.)	April	144
NIETZ, JOHN A.—The Current Use of Teachers' Application Blanks	March	55
Northeast Junior High School, Reading, Pa	Feb.	68
Northmont School, Reading, Pa	Feb.	65
O		
Oak Park Gymnasium, The, (N.)	April	80
Oil Builds Permanent School Funds in Oklahoma, (N.)	June	112
One Thing That Does It	March	138
Operation of the Building Program at Revere, Mass., The, (N.)..	March	89
Orange High School, The	April	57
Organization of the Attendance Department at Detroit, Mich., (N.)	May	93
Organization of a Public-School Staff, The, Samuel E. Burr....	June	49
Otley Grammar School, Otley, England	March	65
Overbrook High School, Philadelphia, Pa., The	Jan.	66
P		
Penn High School, Harrisburg, Pa	Jan.	86
PERKINS, W. H.—A Louisiana Parish School Board	May	47
PESMAN, M. WALTER—Landscape Development of School Grounds	Feb.	47
PESMAN, M. WALTER—Landscape Development of School Grounds	May	45
Philadelphia School Board Must Economize, (N.)	May	78
Planning of Schoolhouses in California, The, (N.)	Jan.	110
Practical Plan of Accounting for High-School Funds in Grain Valley, Mo., (N.)	June	130
Present Teacher Surplus, The, A. V. Lockhart	May	40
Princeton Junior-Senior High School	April	64
Principles Governing the Employment of Teachers	Feb.	50
Prison-Made Furniture and Supplies for the Schools, (Ed.)	Jan.	90
Problem of Flooring in Schoolhouses, The, J. W. Miller	Jan.	136
Problems of a School Director	June	44
Professional Literature for High-School Principals, James L. LaPoe, (N.)	March	144
Program of the Boston Meeting of Department of Superintendence	Feb.	56
Program of the National Association of Public-School Business Officials	March	56
Progress in Educational Convention Publicity, (Ed.)	May	68
Protecting the School Playground, Kent Lighty	March	44
Protecting the School Playground, Kent Lighty	April	50
Providing a Home for the Lynn School Officials	April	42
Pueblo School Bookshop Saves Money, (N.)	April	144
Purchase and Distribution of School Supplies, The, (N.)	Jan.	104
Purification of Water With Reference to Swimming Pools, Frank E. Hartman	May	55
Purification of Water in Swimming Pools, The, Frank E. Hartman	June	53
Q		
Qualifications of Teachers, The, Ernest Bennett	May	65
R		
Rank of School Systems in North Carolina, The, (N.)	Jan.	143
Rating Teachers for Promotion in New York City, (N.)	March	114
Reading School-Building Program, The	Feb.	59
Reading Senior High School, The	Feb.	58
Reorganization of the Superintendent's Office in New York City, (N.)	May	98
Research in the Business Management of Public Schools, Harry P. Smith	March	53
Research in the Business Management of Public Schools, Harry P. Smith	April	45
Rewriting School Property Insurance at Manhattan, Kans., (N.)...	June	172
Right of Pupils to Continue in School, (N.)	May	98
Riverside School, Reading, Pa	Feb.	64
ROBINSON, ERDIS—Standardizing the Work and Pay of School Janitors in Columbus	June	45
Rules Governing Eleventh-Year Leave of Absence, (N.)	March	112
Rules Governing Tuition Rates for Nonresident Students, (N.)..	March	84
Rules of the Philadelphia Board of Education, (N.)	June	112
Rulings Applying to the Custodian of School Moneys, (N.)	May	128
S		
St. Louis School Board Adopts New Rules, (N.)	May	88
Salary Schedule for Seattle School Executives, (N.)	April	90
Salesmanship From a School Buyer's Viewpoint, John H. Jollief..	Feb.	69
Salary Schedule for Bessemer Township Schools, Ramsay, Mich., (N.)	June	146
Saving Space by Tote Boxes, Paul G. W. Keller	June	80
Schedule of Standardized Rooms in Academic High Schools, New York City, William H. Gompert	Jan.	190
SCHMIDT, HANS.—School-Building Ventilation	March	49
Scholarship of Teachers in North Carolina, (N.)	Jan.	126
School Accounting System in Arizona, (N.)	Feb.	78
School Administration—Retrospective and Prospective, (Ed.)	May	68
School-Board Elections and Popular Suffrage, (Ed.)	Jan.	91
School-Board President Who Can Speak, (Ed.)	March	67
School Boards and Superintendents—A Plain Talk, C. W. Meyers.	Feb.	42
School Budgets in North Carolina, (N.)	March	141
School-Building Competitions, Charles Butler	Jan.	41
School Building in Arkansas, C. M. Hirst	Jan.	88
School-Building Programs in Large Cities	Feb.	124
School-Building Programs in the Cities of the United States, (N.).	Jan.	189
School-Building Ventilation, Hans Schmidt	March	49
School-Census System in Michigan, (N.)	May	96
School Costs in Their Relation to General Municipal Costs, (Ed.).	Jan.	90
School Marking System, The, (N.)	May	100
School People and Business Investments, (Ed.)	March	67
School Superintendent as a Professional Leader, The	March	46
School Superintendent's Participation in Community Affairs, (Ed.)	March	66
School Supply End of a School System, The, (Ed.)	June	68
School-Tax Considerations and the Problem of Support, (Ed.)...	May	69
School Ventilation Studies of the New York Commission on Ventilation, Thomas J. Duffield	Jan.	57
Scotch Plains High School, The	May	62
SCHUSSMAN, L. G.—The Value of Measurement in the Classroom.	April	53
Seattle Meets Teacher Issue Squarely, (N.)	June	72
Seasonal Variation in Growth of School Children, Dr. Haven Emerson, (N.)	Jan.	148
Season of School-Board Elections, (Ed.)	March	67
Selecting Playground Workers, (N.)	June	100
Selection of High-School Textbooks, The, H. E. Dickerman	Feb.	90
Shake-up in the New York School-Building Department, The, (Ed.)	Feb.	70
SHAW, E. O.—The Functions and Relations of the Superintendent and the School Board	June	51
SIBLEY, GABRIELLE E.—Little Schools for Little People	April	57
Sick Leave for Teachers, F. T. Goodier	May	44
Single-Salary Schedule at Seattle, Wash., The, (N.)	April	90
SMITH, HARRY P.—Research in the Business Management of Public Schools	March	53
SMITH, HARRY P.—Research in the Business Management of Public Schools	April	45
Social Composition of Boards of Education, The	April	41
Some Chicago Lessons in School Administration, (Ed.)	Feb.	71
Some Fundamentals of College and University Library Buildings, Frances Warner and Charles H. Brown	June	79
Some Obstructions to Efficient School Administration, (Ed.)	April	66
Some Outstanding Policies of the Board of Education at Wilson, Okla., George Jolley	May	40
Southern Junior High School, Reading, Pa	Feb.	67
SPAIN, CHARLES L.—Major Problems in School Administration.	June	92
Standardized School Financing at Sacramento, Calif., (N.)	May	76
Standardizing the Work and Pay of School Janitors in Columbus, Erdis Robinson	June	45
Standards for Folding and Portable Chairs, (N.)	April	92
State of Washington and the Educational Door, The, (Ed.)	Feb.	71
State School Funds and Their Apportionment, Fletcher H. Swift..	Feb.	39
State School Funds and Their Apportionment, Fletcher H. Swift..	April	39
State School Funds and Their Apportionment, Fletcher H. Swift.	June	41
State School Officers' Meeting at Washington, (N.)	May	134
Statistics of State School Systems, (N.)	Jan.	135
Status of Committees on Boards of Education, (N.)	Feb.	96
Status of the Indiana Teacher-Tenure Law, (N.)	May	133
Status of Schoolhousing in New Jersey in 1927-28, (N.)	May	106
STEINER, M. S.—The Technic of Interviewing Teachers	June	65
STONE, CLARENCE R.—Functions of the Elementary Principal..	May	54
Street Car for School Children of San Francisco, (N.)	April	124
Study of Cost Trends in Education in the State of Pennsylvania, A. J. C. Werner, (N.)	Jan.	125
Sunset High School, Dallas, Tex	March	58
Superintendent and the Applicant, The, G. H. Marshall	May	51
Superintendent of Schools and the New School Building, The, James O. Betelle	Jan.	39
Superintendent of Schools in a City of Five Thousand, Everett C. Hirsch	Feb.	55
Superintendent Who Consults Committees, A, (N.)	March	109
Survey of Endemic Goiter in Oregon, A	Jan.	148
Survey of Massachusetts School Terms, (N.)	Feb.	86
SWIFT, FLETCHER H.—State School Funds and Their Apportionment	Feb.	39
SWIFT, FLETCHER H.—State School Funds and Their Apportionment	April	39
SWIFT, FLETCHER H.—State School Funds and Their Apportionment	June	41
T		
Taylor Road School, Cleveland Heights, Ohio	Jan.	80
Teacher Absence and Sick-Leave Regulations, (Ed.)	June	68
Teachers' Licenses in the District of Columbia, (N.)	Jan.	140
Teachers' Salary Schedule at Box Elder, Utah, (N.)	May	130
Teachers' Service Standard at Sioux City, Iowa, (N.)	April	126
Teacher Surplus and the Raising of Standards, The, (Ed.)	May	68
Technic of Interviewing Teachers, The, M. A. Steiner	June	65
Texas School Buildings of Note, R. P. DeWitt	March	57
That Feminine School Director	March	46
Then and Now in School Finance, Charles Black	Jan.	101
TURNER, JAMES M.—Factors Determining the Size of a High-School Building	Jan.	46
Two Changes at Birmingham, Ala., Willie Driskill, (N.)	June	130
Tyler Junior High School, Tyler, Tex	March	62
V		
Value of the Budget in the Schools of Hamtramck, Mich., J. D. Zwonkiewicz	Feb.	38
Value of Homework as Compared with Supervised Study, (N.)..	Feb.	86
Value of Measurement in the Classroom, The, L. G. Schussman...	April	53
Van Hornesville School, The	April	61
W		
WADHAMS, J. ANDRE—From Fraternities to Clubs	March	51
WARD, FRED J.—Cardinal School Pests	March	47
WARNER, FRANCES—Some Fundamentals of College and University Library Buildings	June	79
WEHN, WILBERT C.—Keeping School Expenditures Within the Appropriations	April	94
What Constitutes a Representative Board of Education? (Ed.)...	March	66
What Teachers Want in School Buildings, J. E. Fearon	Jan.	76
When Education and Commerce Meet, (Ed.)	April	67
When the Superintendent Loses His Popularity	March	38
WHITE, M. C.—Keeping School-Board Members Informed	May	72
Why Some School-Bond Issues Have Failed, (Ed.)	June	68
William Ittner's Suburban Schools Around St. Louis, Emily G. Hutchings	Jan.	48
Wilson Junior High School, Erie, Pa	Jan.	71
Wisconsin School-Board Convention at Milwaukee, The, (N.)	May	175
Wisconsin School-Support Law, The, (N.)	Jan.	125
Wolf School, Philadelphia, Pa., The	Jan.	61
Woodrow Wilson High School, Dallas, Tex	March	60
Working Schedule of the Superintendent of Schools, The, R. K. McGee	May	66
Work of the Division of Research, St. Paul, Minn., (N.)	Feb.	86
WOZNIAK, STANLEY L.—A Decalog for School-Board Members.	March	39
Z		
ZWONKIEWICZ, JOSEPH J. D.—The Value of the Budget in the Schools of Hamtramck, Mich	Feb.	38

Natural Slate Blackboards in the Classroom of Burroughs School, Washington, D. C. Mr. A. L. HARRIS, *Municipal Architect*

Always Like New—

No matter how many years after, Natural Slate Blackboards will always be in as fine condition as the day they were installed.

They are Sanitary, Dustless, Fireproof, Permanent, Economical, Easy-to-write-on, Easy-to-read-from, Easy-to-clean—a material that meets all modern school-room requirements in a most adequate way. Their "First Cost Is Their Only Cost" cuts upkeep expenditures to the very bone.

Write for interesting data on Natural Slate Blackboards.

Branch Offices in Principal Cities

NATURAL SLATE BLACKBOARD CO.—108 ROBINSON AVE., PEN ARGYL, PA.

NATURAL SLATE BLACKBOARDS

School Section No. 7, East York Township

R. H. McGREGOR SCHOOL
COXWELL & SAMMON AVE'S.
PHONE GROVER 9144

A. CROFT, SEC. TREAS.
64 HOLBORNE AVE.
GR. 4718

PLAINS ROAD SCHOOL
PLAINS ROAD

Toronto, (6) August 15th. 1927.

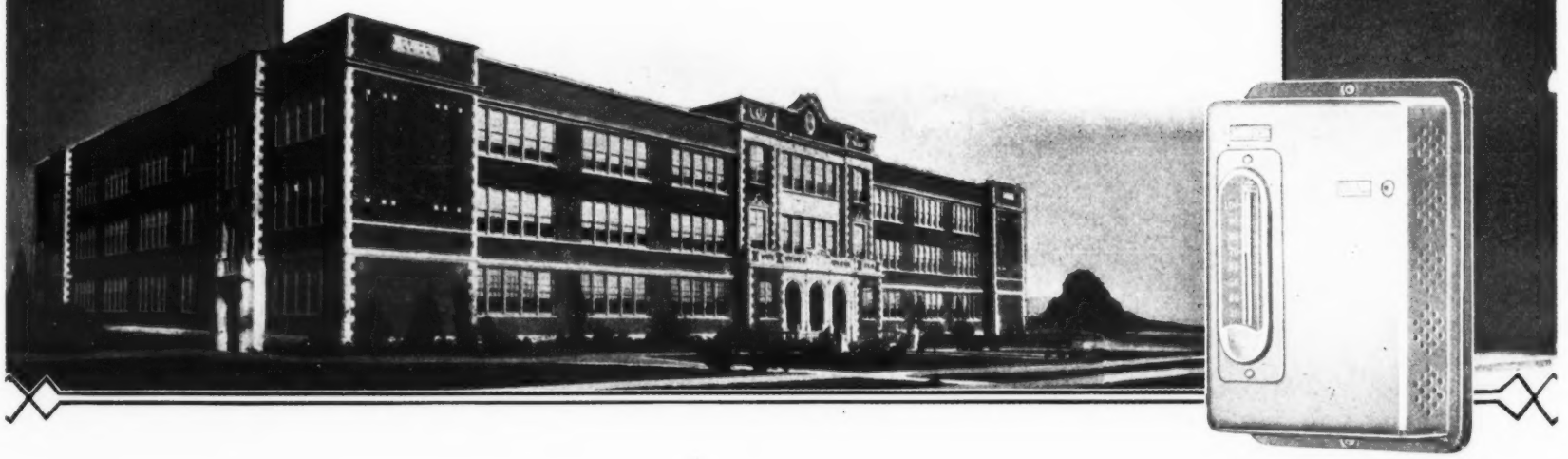
Dear Sirs:

When the question of Temperature Control was being considered for the R. H. McGregor's School, East York Township, the committee went into the matter very carefully and, as part of the School was going to be used considerably at night, we decided that the Johnson Dual Control System would suit our requirements better than any other. Although this installation has only been in operation for a year, we are very well pleased with the results. We realize that keeping the unused parts of the School at a low or night temperature is quite a saving in fuel and at the same time we are getting a more uniform temperature all over the School in the day time.

Yours very truly,

A. Croft
Sec-Treas.

J. W. Thompson
Chairman.

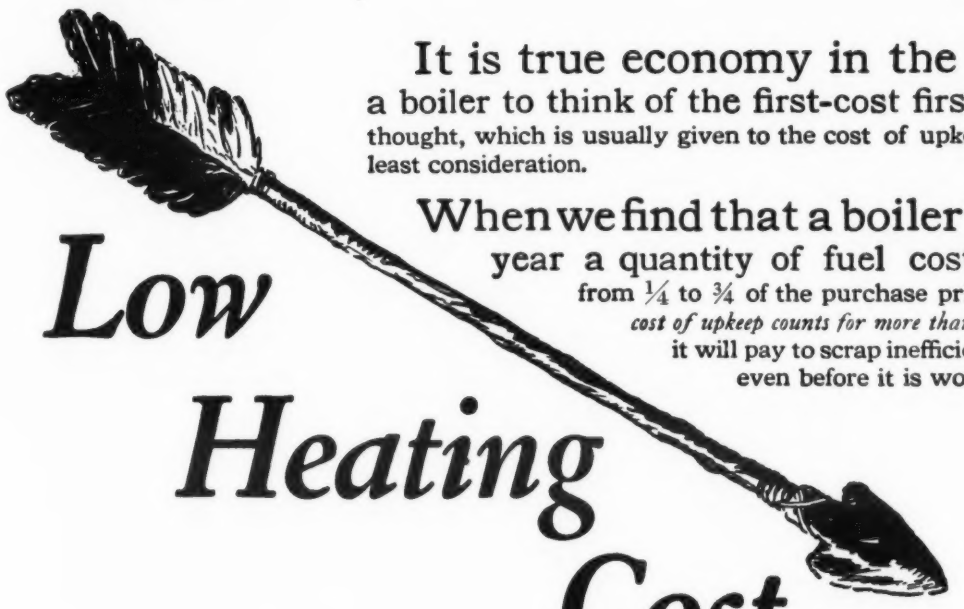


JOHNSON HEAT CONTROL IN SCHOOLS

JOHNSON SERVICE COMPANY
Main Office and Factory : MILWAUKEE, WISCONSIN

AUTOMATIC TEMPERATURE REGULATION SINCE 1885
JOHNSON BRANCHES IN ALL PRINCIPAL CITIES

KEWANEE
STEEL Riveted
BOILERS



Low Heating Cost

It is true economy in the purchase of a boiler to think of the first-cost first. But the last thought, which is usually given to the cost of upkeep, must not be the least consideration.

When we find that a boiler burns every year a quantity of fuel costing anywhere from ¼ to ¾ of the purchase price, then we know the *cost of upkeep counts for more than the first cost.* Actually it will pay to scrap inefficient heating equipment even before it is worn out.

But the best time of all to scrap a cheap, uneconomical boiler is before the idea of buying it has materialized into action.

In order to figure on the least cost of heating a building, it is necessary that the first cost of the boiler be sufficient to include sound riveted construction, with the best quality of steel. And then, if the name KEWANEE is on the boiler you may be sure of all those features of design which will guarantee economy of upkeep in operation throughout the life of the building.

BE GUIDED BY THIS FOUNDATION
STRENGTH HONOR QUALITY SERVICE
RICE LEADERS OF THE WORLD ASSOCIATION

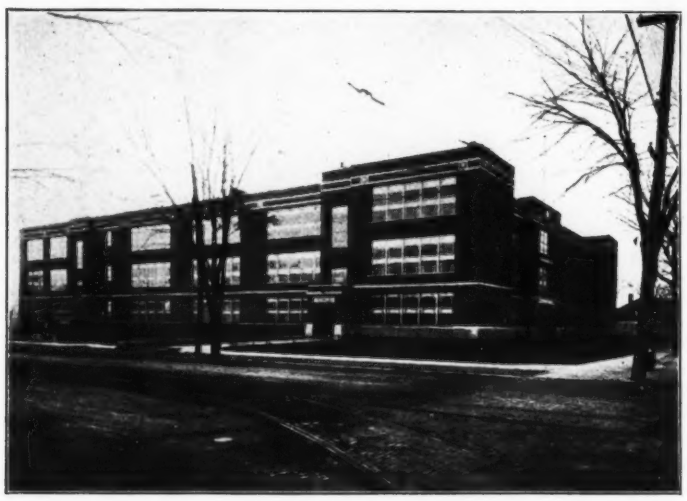
KEWANEE BOILER COMPANY

Kewanee, Illinois *Branches in Most Leading Cities*

STEEL HEATING BOILERS RADIATORS WATER HEATERS TANKS AND WATER HEATING GARBAGE BURNERS

RESULTS COUNT MORE

BINGHAMTON N. Y.
ADOPTS
HEATOVENTS
FOR ITS THIRD NEW HIGH SCHOOL BLDG.



Christopher Columbus School erected in 1926 was equipped with forty-seven (47) Buckeye Heatovents.

Architects

TIFFANY & KALEY, Binghamton, N. Y.

Heating Contractor

GAYLORD & EITAPENC, Binghamton, N. Y.

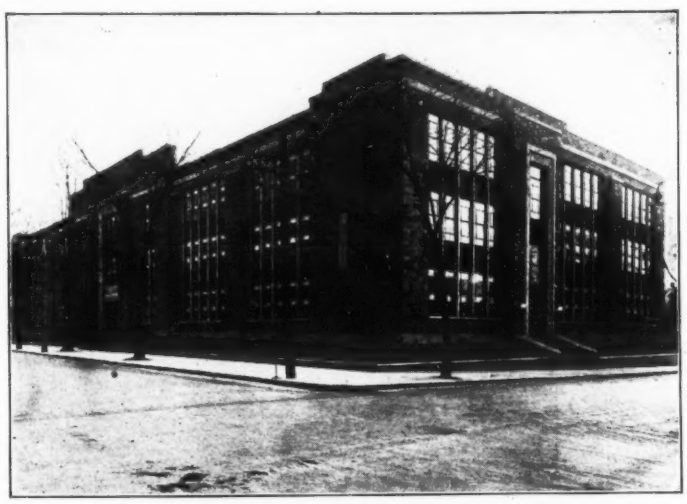
East Junior High School erected in 1925 was equipped with forty-nine (49) Buckeye Heatovents.

Architects

T. I. LACEY & SONS, Binghamton, N. Y.

Heating Contractor

M. E. Lewis, Binghamton, N. Y.



BENJAMIN FRANKLIN School now under construction will be equipped with Forty-nine (49) Buckeye Heatovents. Heating Contract let to Gaylord & Eitapenc, Binghamton, N. Y. Architects, Conrad & Cummins, Binghamton, N. Y. (photo not yet available).

Results from previous installations are the best recommendations for the use of Buckeye Heatovents, the modern, self-contained Unit Heating and Ventilating System.

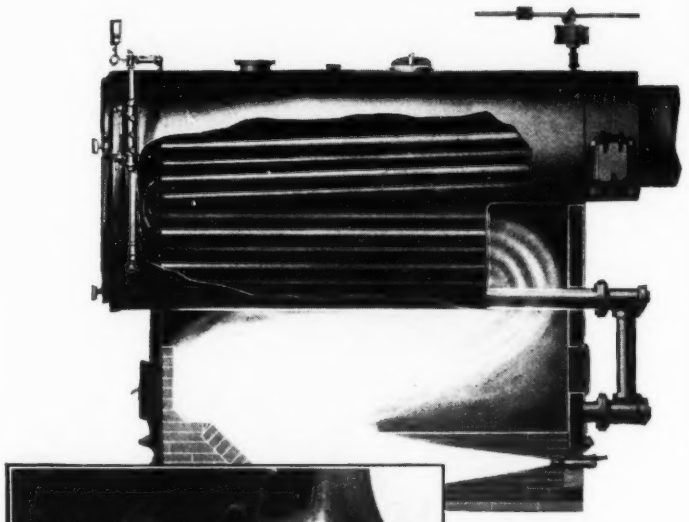
THE BUCKEYE BLOWER CO.
COLUMBUS, OHIO

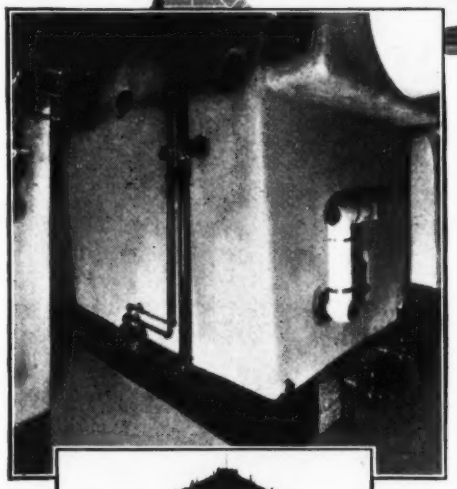
BRANCH SALES AND SERVICE OFFICES

Atlanta, Ga., 254 Peachtree St.
Baltimore, Md., 2126 Edmondson Ave.
Birmingham, Ala., 321 Brown-Marx Bldg.
Boston, Mass., 260 Tremont St.
Buffalo, N. Y., 321 Jackson Bldg.
Chicago, Ill., 401 Transportation Bldg.
Cleveland, Ohio, 204 Plymouth Bldg.
Denver, Colo., 1226 California St.
Detroit, Mich., 400 Penobscot Bldg.
Hempstead, L. I., N. Y., 2nd National Bank Bldg.
Indianapolis, Ind., 3115 N. Central Ave.
Kansas City, Mo., 1101 Pioneer Trust Bldg.
Los Angeles, California, 1824 S. Hope St.
Milwaukee, Wis., 409 Loan & Trust Bldg.
Minneapolis, Minn., 416 Essex Bldg.
New York City, 1400 Broadway.
Newark, N. J., 403 Military Park Bldg.
Pittsburgh, Pa., 709 Columbia Bank Bldg.
Portland, Ore., Security Bldg.
Salt Lake City, U., 402 Scott Bldg.
San Francisco, Calif., 746 Sansome St.
Syracuse, N. Y., 324 Union Bldg.
Toronto, Canada, 21 River St.
Youngstown, Ohio, 1101 Realty Bldg.

The Pacific rear-firing principle for oil burning is fundamentally sound

This Operating Test Proved It





Mark Hopkins Hotel, San Francisco. Geo. D. Smith, Managing Director. Weeks & Day, Architects, Leland & Haley, Mechanical Engineers. Heated by two No. 824 14,000 sq. ft. Pacific rear oil-fired boilers, installed by Knittle Bros.

1. *Efficiency* — ranged from 83.05% at 82.8% of rating to 76.91% at 152.4% of rating.

2. *Overload Capacity* — boiler developed 152.4% of rating with high efficiency and no priming.

3. *Dry Steam* — only 0.93% water in separator box at 152.4% of rating.

4. *Low Flue Gas Temperature* —only 603° F. at 152.4% of rating.

One actual operating test by disinterested engineers of standing, is worth any number of factory or laboratory tests. The much-discussed test by Leland & Haley on the Pacific Boilers installed in the Mark Hopkins Hotel, San Francisco, is a case in point. It proves conclusively that the principle of four-time fire travel, found in no other type of boiler, gives most satisfactory results, by whatever standard you measure the success of the installation. Gases travel twice the length of the combustion chamber before entering the lower bank of tubes, then twice the length of the boiler through the tubes. Write for booklet containing complete data on this notable test of Pacific rear oil-fired boilers.

STEEL HEATING BOILERS PACIFIC WAUKEGAN, ILL. BRISTOL TRADE MARK REG. U.S. PAT. OFF.

PACIFIC
STEEL HEATING BOILERS
Factories: **WAUKEGAN, ILL., BRISTOL, PA.**

Von Duprin

Self-Releasing Fire Exit Latches

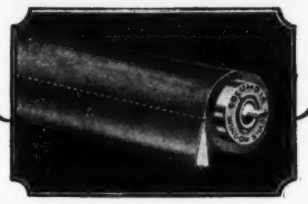
Sweets, Pages B1876-1879.

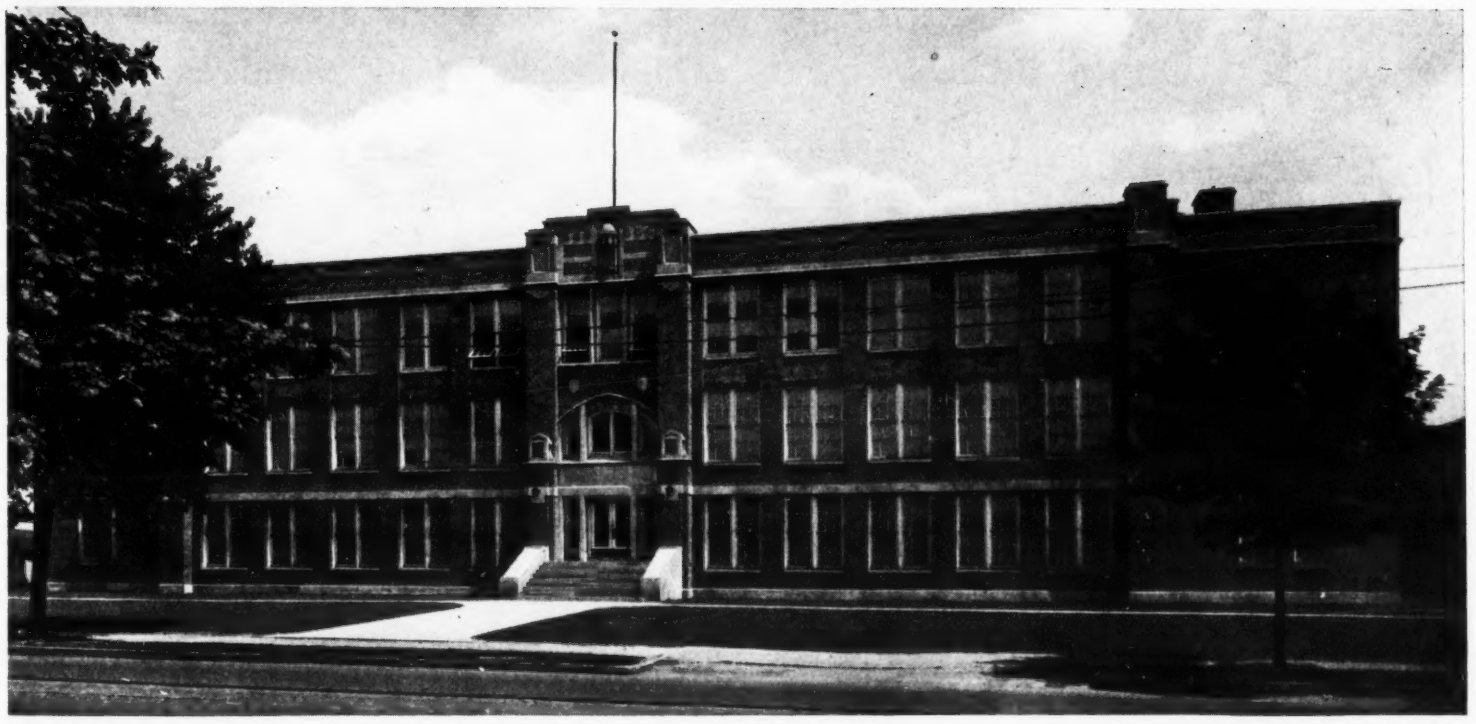
AIA 27c5

The certainty that those in a building have the best possible protection against panic fatalities is well nigh priceless--Yet a complete Von Duprin installation seldom adds more than a small fraction of one per cent to the cost of the building.

AIA

VONNEGUT
HARDWARE CO.
Indianapolis, Ind.





Architects, Walker & Norwick,
Dayton, Ohio

JOSEPH WELTY JUNIOR HIGH SCHOOL,
New Philadelphia, Ohio

Equipped with
Columbia Window Shades & Rollers

What do wild claims *really mean?*

MOST of us are somewhat tired of manufacturers' over-statements. "Famous for durability!" reads one advertisement. "Long life!" shouts another. "Phenomenally durable!" roars a third. But what do such claims really mean?

Instead of claiming that our Damasko Heavy Duty Shade Cloth is "the most durable shade cloth made in America today"—we will simply call your attention to two facts which must be reckoned with in any purchase.

1. *Columbia* Window Shades in the Damasko Heavy Duty Cloth have been installed in several hundred American buildings. Such important institutions as the Stevens Hotel, the Cincinnati Enquirer, and the Harvard School of Business—all bought by men who demand facts!

"But," you may object, "what does that prove? What I want to know is not where they have been installed but how they have acted after the installation."

A fair question. Here's the answer.

2. Recently we investigated a number of *Columbia* installations in school buildings. We found that, in many cases, the annual expense for repairs and replacements had amounted to no more than 25 cents for each $100 of original investment.

Any $100 spent on equipment that doesn't require more than a quarter's worth of repairs every year is a hundred dollars well spent.

The *Columbia* Mills, Inc.

225 Fifth Avenue, New York

Baltimore Boston Chicago Cincinnati Cleveland Dallas Detroit Fresno Kansas City Los Angeles Minneapolis New Orleans Philadelphia Pittsburgh Portland (Ore.) St. Louis Salt Lake City San Francisco Seattle

You can save time and trouble by using the "Standard Specification for Window Shades," which we'll gladly send on request. A specimen roller and samples of *Columbia* Cloth are sent with the specification. Just fill in coupon and mail to The *Columbia* Mills, Inc., 225 Fifth Ave., New York.

Name.....

Street.....

City.....S1-28

Columbia

GUARANTEED
WINDOW SHADES
and ROLLERS

SPENCER

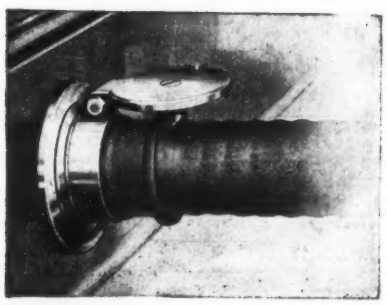
Central Cleaning System

The Multi-Stage Turbine

Spencer Central Cleaning Systems for school buildings have been especially developed to meet the exacting requirements of this particular type of service, and represent, without question, the most thorough, efficient and economical method of cleaning the modern school.

A system of rugged construction, thoroughly perfected in every essential, the Spencer is a machine of great simplicity and durability. There are no valves, belts, chain drives or other complicated mechanisms requiring constant adjustment and repair. The cleaning appliances and tools are few, simple and strong — all wearing surfaces, easily, quickly and inexpensively replaced.

The Spencer System has met with the approval of architects and engineers throughout the entire country and has been adopted for a greater number of important buildings than all other systems combined. Over 1,200 installations in schools alone is convincing evidence of Spencer popularity.



Spencer patented inlet valve in baseboard with hose attached. Note that hose is held in place by the cover, a feature exclusive to Spencer.

The recommendations of our Engineering Department may be obtained on any cleaning problem without cost or obligation.

Write for list of school installations and complete data regarding Spencer equipment.

The Spencer Turbine Company

HARTFORD, CONNECTICUT

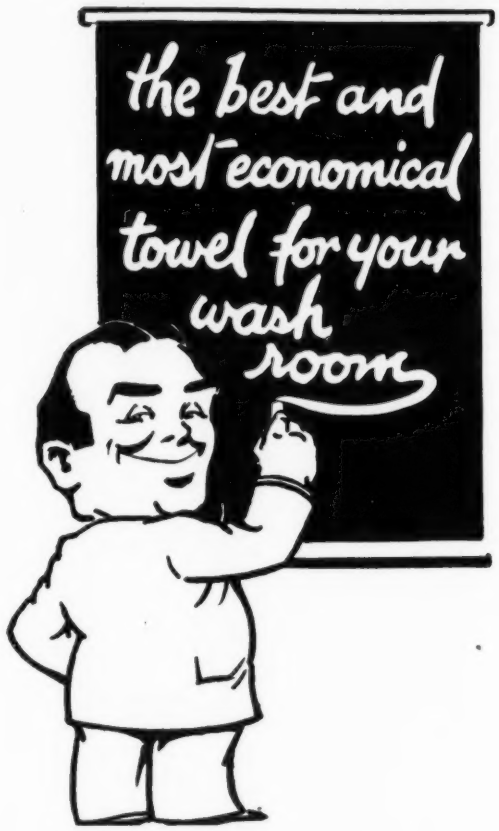
Where Much is Required— Boilers of Steel

YOU never see any but a *steel* boiler in a power plant, in an ocean liner, in a locomotive. Where the highest efficiency, strength and safety are required, steel alone will serve.

For many reasons well recognized by engineers and architects, steel heating boilers, as a class are the most economical, reliable and efficient heating boilers manufactured.

HEATING BOILERS DIVISION
The American Boiler Manufacturers Association

STEEL HEATING BOILERS



The Public Service Paper Towel

is BEST *and* MOST ECONOMICAL *for your washrooms, for these reasons:*

MADE of specially selected paper pulp, this towel is firm, yet soft and absorbent when moist; it is almost cloth-like. One or two will dry the hands perfectly; they are economical.

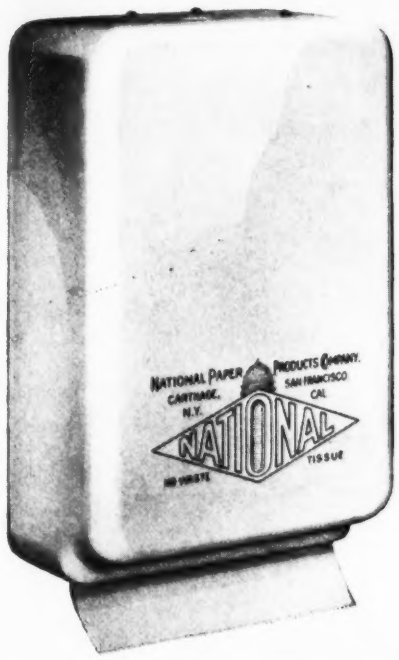
The "hem" or doubled lower edge of the towel prevents wet hands from tearing it in withdrawing from the cabinet—this makes it convenient and precludes wastage from torn towels. No other make of paper towel has this "hem."

The PUBLIC SERVICE cabinet which is furnished with these towels has no mechanism whatever, thus is never out of order. The towels pass out through a slot, one at a time, each pulling out the edge of another into position for grasping. The system prevents wastefulness and aids economy.

Full information, including samples of cabinets and towels, and address of your nearest supplier, gladly sent on request

National Paper Products Company
CARTHAGE, N. Y.

Public Service
PAPER TOWELS



A Superb Cabinet

with Perfect Toilet Tissue

IN THE NEW NO-WASTE cabinet, with the perfect NO-WASTE toilet tissue, buyers will find a combination leaving nothing more to be desired, either in cleanliness and beauty or in economy.

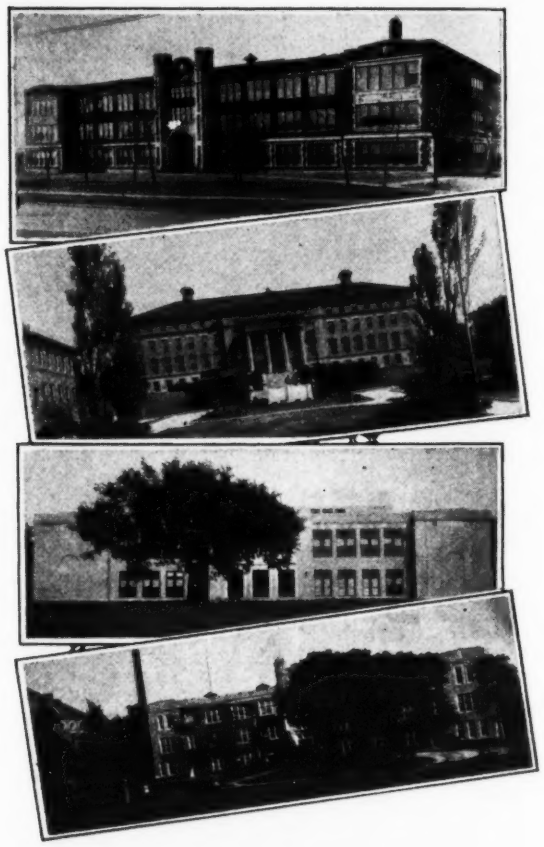
The new cabinet is of steel with porcelain finish. The steel insures endless durability and freedom from breakage. The beautiful porcelain finish cannot be written on nor defaced. A damp cloth cleans off dust and dirt in a jiffy. The cabinet has no mechanism and can't get out of order. The paper is drawn out through a slot in double sheets, with just enough resistance to compel economy. The cabinet can be locked to prevent pilfering. The price is very reasonable.

NO-WASTE tissue is a perfectly clean and sanitary paper, made from selected paper pulp. It is remarkably soft and absorbent, yet firm; will not tear. It is preferred by thousands of users. Efficient and economical.

NO-WASTE TOILET TISSUE

Distributed by leading wholesalers in all principal cities. Details and name of nearest distributor will be mailed on request.

National Paper Products Company
CARTHAGE, N. Y.



Above is shown a group of modern schools located in various sections of the country. All are users of Midland School Products exclusively.

For Health and Comfort in the School Room

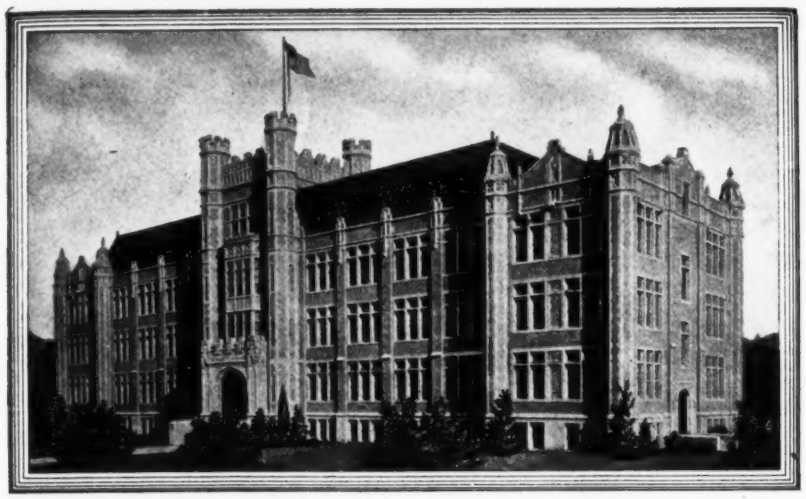
THE Midland Chemical Laboratories have developed many aids to health and comfort and to more efficient work of both students and teachers. CLEAN FLOORS and furniture are, above all else, the most desirable feature of the schoolroom. Midland Liquid Waxoleum is the ideal care-taker for wood or composition floors, desks, seats, and woodwork. It is a remarkable cleanser and a quick polisher.

MIDLAND MINT ALDEHYDE is a spray which destroys bad odors. It immediately purifies foul air and its effect is lasting. MIDLAND FRENCH FLOOR DRESSING for freshly scrubbed wood floors—this penetrating dressing protects and preserves the beauty of wood floors.

MIDLAND BLACKBOARD CLEANER keeps boards an intense black and affords the greatest contrast between board and chalk. Eye strain, a condition causing much worry to teachers, is eliminated by this perfect blackboard cleaner.

The Midland Service Man has something worth while to show you—ask to have him call.

MIDLAND CHEMICAL LABORATORIES, Inc.
DUBUQUE, IOWA, U. S. A.



Oak Floors are in use in the Women's Institute of Domestic Arts and Sciences, Scranton, Pa.

SANITATION

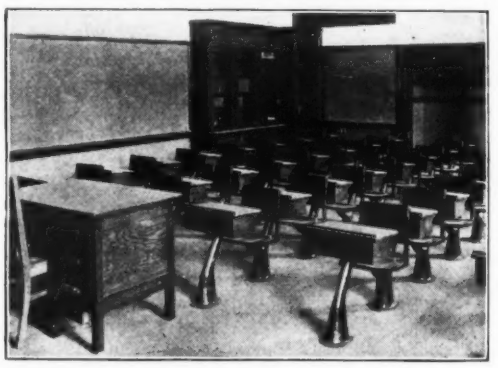
—a prime requisite in school floors

In schools, hundreds of feet tramp in and out daily, tracking dust and dirt. The wear on the floor is continuous and extreme. No material meets the need as does Oak Flooring. It is Nature's own product, healthful under foot, shock-resisting, not cold or artificial; yet it is a permanent floor, enduring heaviest wear, and always beautiful.

Every day should find school floors bright and clean, if buildings are to maintain themselves on the plane that modern standards require. It is easily possible with floors of OAK, laid in tight continuous strips, with no cracks to collect dirt, and a polished surface that makes cleaning easy.

Permanence

As a matter of expense, permanence is as important as sanitation from a health point of view. Oak floors will last; they never need replacement, and with minimum care they keep in perfect condition. The finish, whenever necessary, may be quickly and cheaply renewed.



Economy

Initial cost is low. Upkeep expense is low. When service covers years of hardest usage without deterioration, the economy of oak floors is unquestioned.

Oak Flooring, with side and end matching accurately milled, forms a secure and sound anchorage for desks.

Beauty

The atmosphere of the place where children spend a large part of their character-forming days, is closely studied in the modern school. Sturdy American oak builds respect for soundness and good taste.

Send for valuable free literature

The advantages of oak floors are fully brought out in literature available for your reference files, which will be mailed on request to school board members, and those interested in the equipment and maintenance of schools.

OAK FLOORING BUREAU
1267 Builder's Bldg., *Chicago*

Put your flooring problems up to our experienced experts. We will help you without obligation.

Consult an Architect Before Building

This advice appears in all our national magazine advertising.

Mail the coupon for "The Story of Oak Floors," a 24-page illustrated booklet, containing color plates of the new modern finishes, which harmonize with room decoration.

OAK FLOORING BUREAU, 1267 Builder's Bldg., *Chicago*

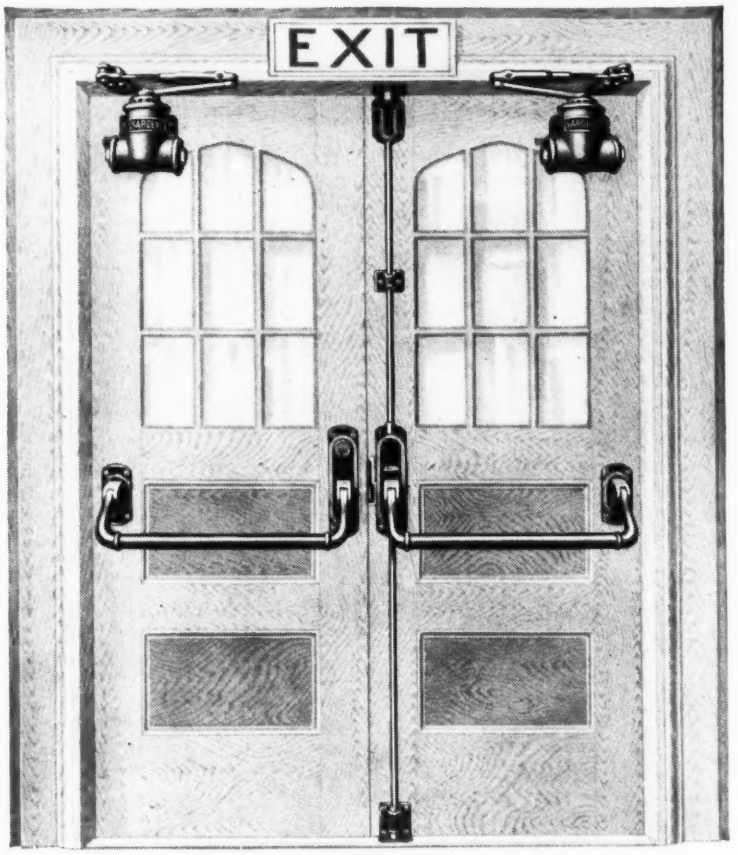
Send me "THE STORY OF OAK FLOORS," a 24-page book with color plates of the new modern finishes; also other useful literature for reference files.

Name.....

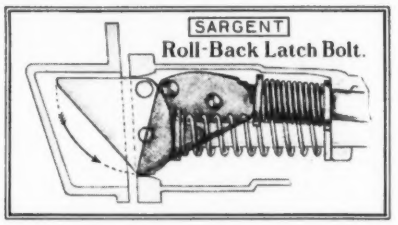
Address.....

City..... *State*.....

A new fire-exit latch bolt that *can't be jammed*



Not even the pressure of a panic-driven crowd can make the Sargent roll-back latch stick



School officials, who are responsible for the protection of the lives of the pupils and are anxious to make proper provision for quick exit in case of fire or panic will be interesed in this new development which has become the standard Roll-Back action for

SARGENT

Fire Exit Door Bolts.

The improved action is shown by the detailed drawing. The Cross Bar does not withdraw the bolts, but releases the deadlocking mechanism, allowing the bolts to be rolled back into the case of the lock as the doors are pushed open.

Security.

The Latches provide complete security and prevent entrance from the outside of the building when the school is not in session, while they can be arranged to permit entrance during school hours if desired.

Quick Exit At All Times.

is provided and in case of necessity the doors can be instantly opened by slight pressure on the handle Bars at any point.

Door Closers

close the doors, during their day by day use, quickly and quietly, the application shown in the illustration with the Sargent special foot (No. 35) being particularly desirable.

Pamphlet illustrating and describing Fire Exit Door Bolts will be mailed upon request.

Sargent Fire Exit Door Bolts, Locks and Hardware are sold by representative dealers in all cities.

SARGENT & COMPANY

Manufacturers

NEW HAVEN, CONN.

New York **Chicago**

SCHOOL AVERAGES DROP IN SEVERE, WINDY, COLD WEATHER

Many a school is compelled to shut down in cold weather when the mercury gets down around zero, and the wind reaches a velocity of 30 miles an hour or more. No school can keep up averages when teachers and scholars are uncomfortable—either too hot or too cold. No matter how well the building may be designed for perfect ventilation, a cold room with drafty windows upsets all the natural lanes of fresh air entrances and foul air exits and the room becomes laden with disease-carrying germs.

Ventilation control, therefore, is dependent upon a sufficiency of warm air to allow the ventilation systems to operate in the way they were originally planned.

With all the modern methods of seasoning wood, it is doubtful if any window will be tight one year after it has been installed and, therefore, to be made impervious to wind and cold, either storm windows (which are, of course, out of the question) or weatherstrips must be used.

High-grade weatherstrips properly installed not only keep out the wind, dust, and dirt, and eliminate drafts, but also allow the windows to be raised and lowered quietly without sticking, keep the windows from rattling, and allow ventilation facilities to function properly.

An interesting test was made by a noted firm of architects in New York City. They made tests of various types of weatherstrips and compiled a chart showing the results. They showed that a 45-mile-an-hour wind passed through an average window (without any type of weatherstrip) at the rate of 2 9/10 cu. ft. per minute. With ordinary metal weatherstrips, the best test showed 1 ft. or more per minute, and with cloth-lined metal weatherstrips, less than ¼ cu. ft., allowing only ½ cu. ft. in a 65-mile-an-hour gale.

It is not diffcult, therefore, to figure that the leakage into a schoolroom with a dozen windows or more soon lowers the temperature to a point where discomfort is the dominating thought.

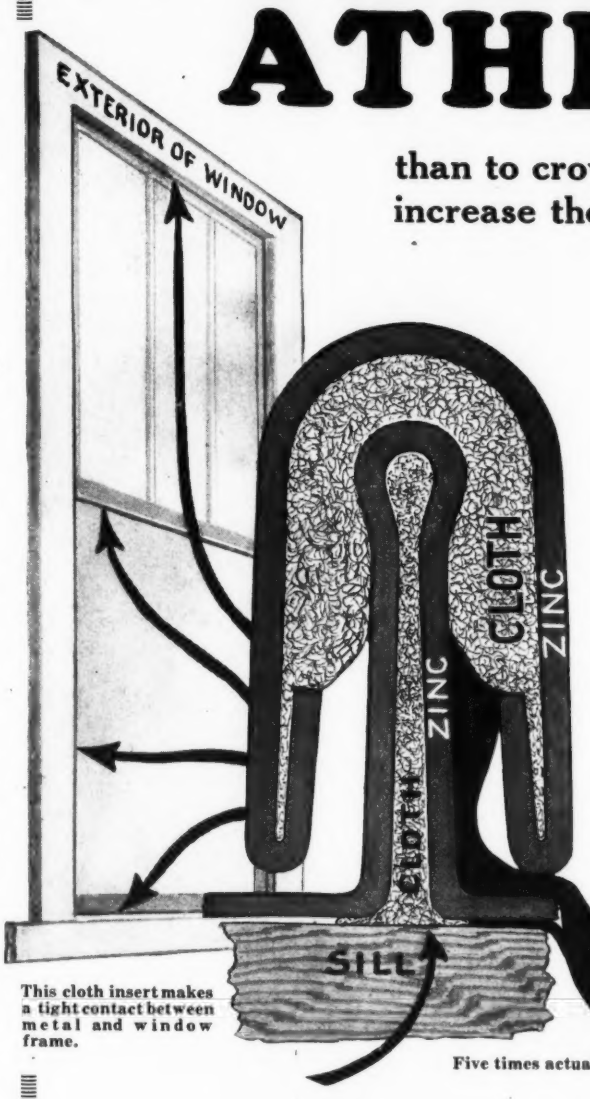
With these facts a matter of public record, it is not surprising that large prominent schools are fast weatherstripping their windows. Hundreds of office buildings and hotels have found that metal cloth-lined weatherstrips pay for themselves in less than three years by the saving in fuel alone, not counting the saving in hauling ashes, dirt, and extra handling and firing costs. One large modern building in Chicago saved 572½ tons of coal in five months over the same five months the year before. Another modern skyscraper was unable to keep their tenants warm and appealed to the architect for a remedy. He replied, "Double your heating capacity —weatherstrip your windows or lose your tenants."

Cloth-lined weatherstrips solved the problem, paid for themselves in less than three years, and will pay dividends in fuel saved for twenty or more years.

The following are a few of the many prominent schools which have greatly reduced coal bills and made their schoolrooms comfortable with cloth-lined weatherstrips:

Streator High School, Streator, Ill.
Purdue University, Lafayette, Ind.
Hamline University, St. Paul, Minn.
Harvard University, Cambridge, Mass.
New Sherman School, Cranford, N. J.
Hecksher Foundation for Children, New York City.

It costs less to ATHEYIZE



This cloth insert makes a tight contact between metal and window frame.

Five times actual size

than to crowd the heating plant or increase the heating capacity.

Cold Air cannot enter an ATHEY protected window

SAVES FUEL— ADDS COMFORT

ATHEY Cloth-to-Metal contact weatherstrips change any wood or steel window from a rattling, loose, drafty sash to one that works smoothly and quietly and is absolutely draft-proof when closed.

Why force the Heating Plant by trying to heat all outdoors when a simple ATHEY installation quickly pays for itself with the saving in fuel?

THE ONLY CLOTH LINED METAL WEATHERSTRIP

Exhaustive tests of various well known mechanical devices for reducing air leakage through windows found that ATHEY cloth-lined metal weatherstrips were eleven times superior in reducing leakage over non-weatherstripped windows and more than four times as efficient as the best of other installations.

Send for this New Athey Book

It contains valuable information for any building owner or manager, architect or engineer desiring to save fuel, prevent drafts, and increase comfort.

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***Cloth-Lined Metal* WEATHERSTRIPS**

And Perennial Window Shades for Schools

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Stop Signing Repair Bills!

Protect Concrete Floors

Whether new or old, concrete floors need hardening to resist wear. Otherwise unhealthy concrete dust is scuffed up, and hollows or holes appear.

Lapidolith, the original concrete floor hardener, will make your concrete floors permanently wear-proof and dust-proof.

Lapidolith penetrates concrete, bringing the loose particles into a close-grained mass that is granite hard.

Easy to apply. Goes on floor like water. No experience needed to do the work, so labor cost is low.

Safeguard Wood Floors

One application of Lignophol not only hardens the surface to resist wear, but penetrates into the interior wood cells and fibres. The life-giving gums and oils in Lignophol restore the elasticity and endurance of the wood.

Do not waste money on messy oils or ordinary floor treatments. They evaporate or wear off. One Lignophol treatment keeps your wood floors young and strong for years.

Keep the Classrooms, Hallways, Auditorium Bright and Cheerful

Cemcoat is a paint specially designed for this purpose. It stays white after other paints turn yellow. Finger prints, ink or pencil stains can be washed off without injuring the paint. Can be washed over endlessly.

This remarkable paint will not chip or peel. It adheres to plaster, concrete or brick walls as easily as to wood. Usually, one less coat than customary is required because of its exceptionally heavy body.

Keep Out Dampness

Damp buildings are costly to heat. They are unhealthy for pupils. By treating your outside walls with Hydrocide Colorless, you can have a warm, moisture-proof building. Since it contains no paraffin, this product will not run in hot weather.

Write us that you would like further information and we will send you more complete data and demonstration samples.

L. Sonneborn Sons, Inc.
114 Fifth Ave., New York

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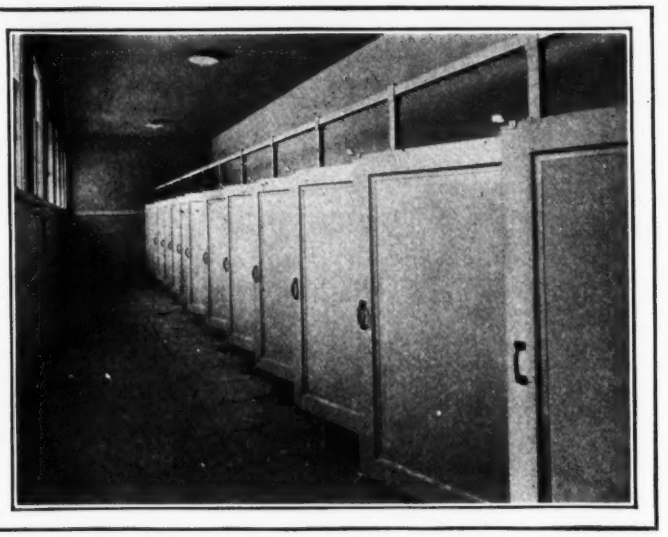

The Utmost in Sanitation

Weisteel compartments are especially designed to eliminate ledges and crevices which catch or hold dirt. This sanitary feature is just one more reason why architects and builders all over the country are increasingly specifying Weisteel products for public schools.

An exclusive feature of Weisteel is our cooperative plan. Just send a rough layout of toilet rooms, indicating plumbing facilities and requirements, and we will gladly make up plans and specifications without any obligation on your part.

Compartments are shipped with simple diagram and complete erection instructions indexed to numbered compartment sections. No fitting, cutting or drilling is necessary when erecting, and it is virtually impossible to make mistakes.

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TRADE MARK REGISTERED
COMPARTMENTS

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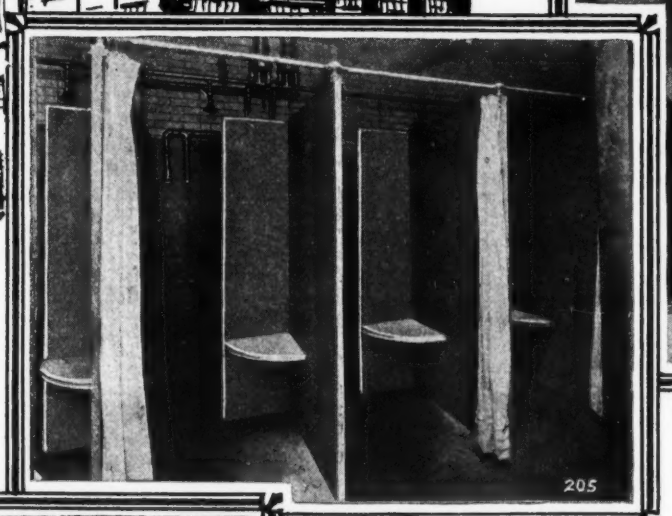
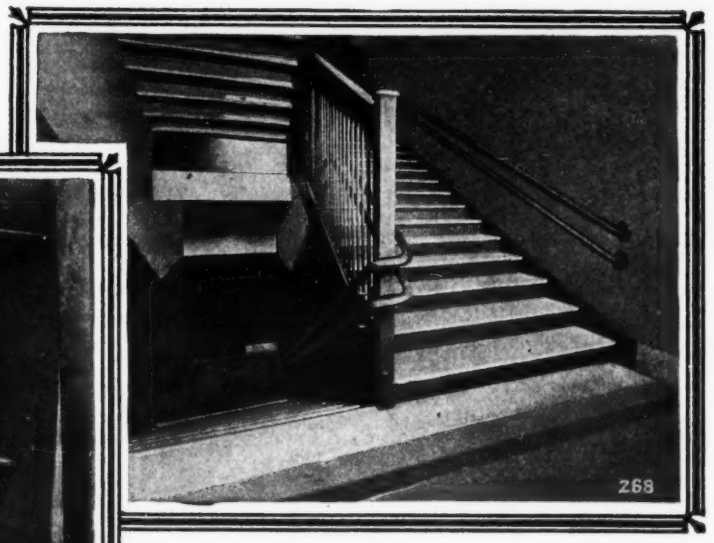
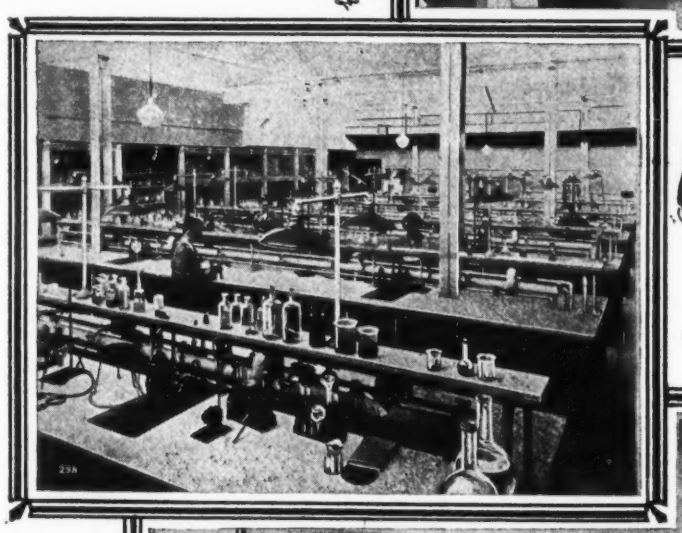
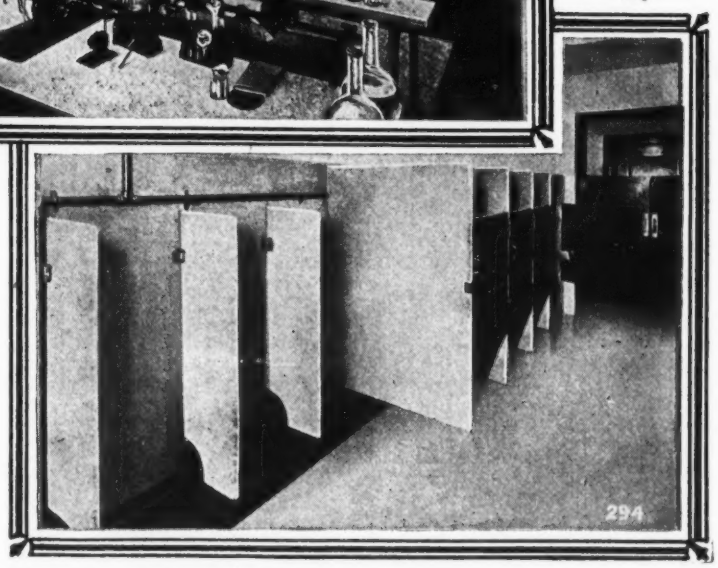




These illustrations from modern school plants show typical applications of Alberene Stone for Stair Treads, Shower Stalls and Dressing Rooms, Laboratory Equipment, Toilets and Urinals.





THE outstanding superiority of Alberene Stone for the purposes here pictured lies in its ability to resist the agencies which impair or destroy all other materials under like service conditions.

Briefly summarized, its distinctive advantages are these: a non-stratified stone, free from cleavage lines, which will not fracture, split or spall; absolutely non-absorbent, therefore non-staining and highly sanitary; a surface that is hard, smooth, and easily cleanable; highly resistant to acids and alkalis; heat-proof—will not break down at excessive temperature; easily machined in any form, and assembled with tongue-and-groove, liquid-tight, germ-proof joints without any exposed metal.

Alberene Stone is a standard material for many school purposes, upon which the cost is lowest. Write for the Catalog.

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The Most Modern Light for School Illumination

ARCHITECTS and Engineers have chosen Duplex-a-lites for the lighting of many of the largest schools in the country. There is nothing to compare with them for quality of illumination, ease of cleaning, simplicity, durability of construction and cost.

Let us send you our new catalog covering the entire Duplex-a-lite line.

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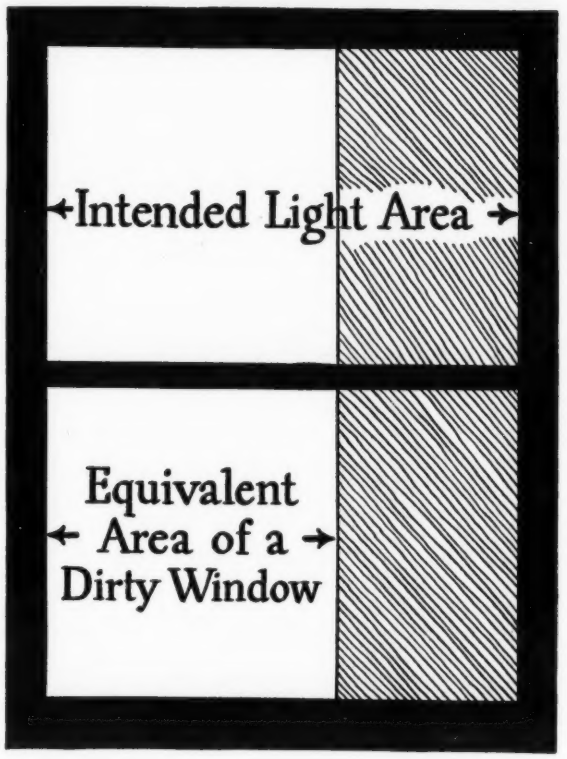
Nature constructed the eyes for horizontal rays, for outdoor light which comes directly down, therefore eyes are naturally shielded from light of sun and sky by forehead, brows and lashes. The Duplex-a-lite embodies this principle of nature.



CLEAN WINDOWS mean as much as GREATER LIGHT AREA

MOST states require a high percentage of light area in schoolrooms. This indicates the importance of light in school buildings.

But the intended window area will not be effective unless windows are kept clean. A window that is only ordinarily dirty, tests show, reduces the incoming light by at least 30%.

Williams Reversible Window equipment makes window cleaning a simple job. There is no need to postpone the work on account of inclement weather. Both upper and lower sash are completely reversible for cleaning from inside the room, and the cleaning may be done as often as necessary by the regular staff.

For ventilation, the sash may be tilted to any desired angle, deflecting incoming air upward, and allowing the circulation of fresh air without draft.

For complete information, write to:

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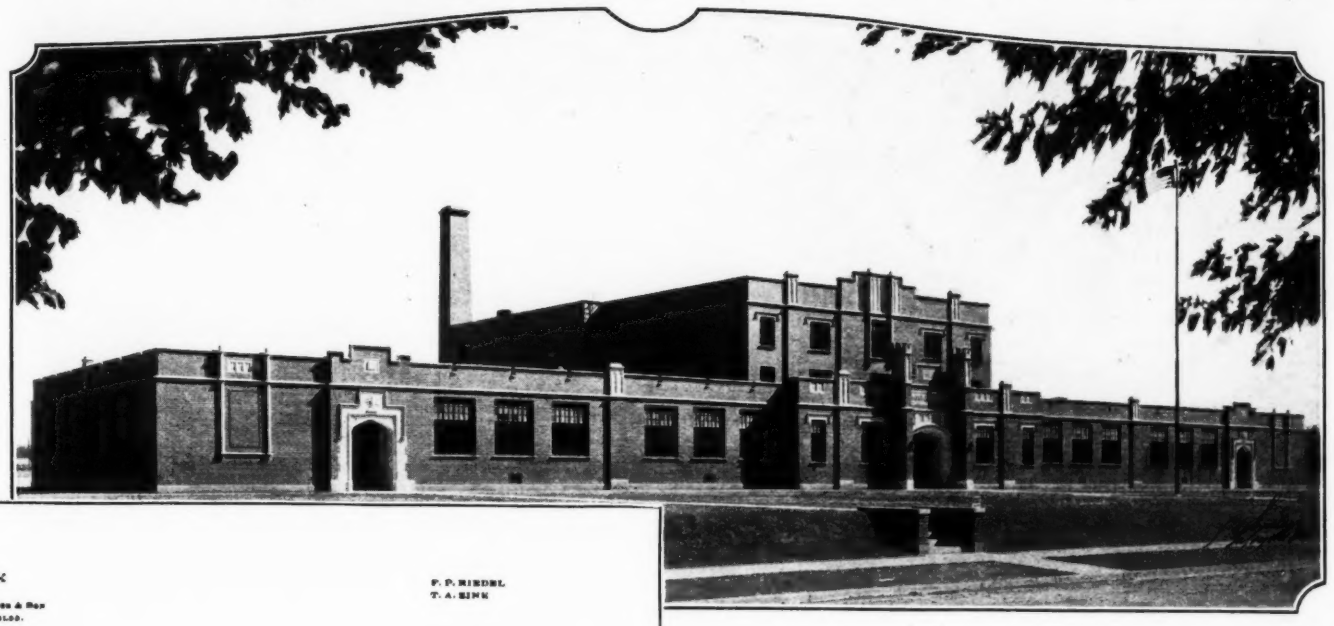
More Natural Daylight Without Glare



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Nov. 28, 1927.

Manufacturers Glass Co.,
38 South Dearborn St.,
Chicago, Ill.

Gentlemen:-

I beg to acknowledge the receipt of your letter of Nov. 25th relative to the delivery of Pressed Lens Glass in the Longlois School Building, this city.

Please be advised that all of the glass arrived in time to allow the Glaziers to install same before the opening of school for the "Fall Term", and for this reason the School Board, the Building Contractor, and myself feel very much indebted to your company for your promptness in making shipment.

It may be of interest to you to know that this is the second large school built in this city in which Pressed Lens Glass has been used in the upper portion of all exterior window openings also all class rooms doors and all transom sash over interior and exterior doors, and ceiling sash under all skylights. It might interest you further to know that when plans etc. were being drawn up for the second building, the School Board was unanimous in accepting my suggestion that Pressed Lens Glass again be used, they stated that the School Principal and Teachers of the first building were highly pleased with the results obtained such as, the diffusion of light rays being equally distributed to all parts of the room, the elimination of glare and shadow and a light that is always soft and not injurious to the eyes.

Again thanking you for your hearty co-operation in helping us to complete the building in time, I wish to remain,

Very truly yours,

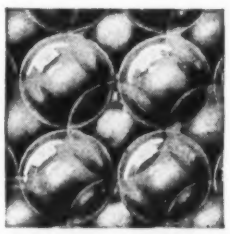
FPR/IR

Pressed Lens Glass as installed in this modern school permits flood lighting by natural daylight without glare and practically without shadows.

Hundreds of other schools have solved the same problem in the same way.

Correct illumination is now recognized as so important to the child's welfare, both mental and physical, that it is receiving the foremost consideration of both School Boards and Architects. By specifying and installing Pressed Lens Glass as manufactured by the Manufacturers Glass Company, 1702 First National Bank Building, Chicago, Illinois, they are making certain that children be permitted to develop minds and bodies under the most advantageous conditions.

It will pay you to investigate this modern development.

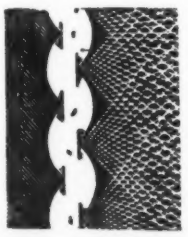


SCHOOL BUILDINGS PARTICULARLY NEED PRESSED LENS GLASS

It is made up in sheets up to 50" x 100", also in 4" x 4" tiles glazed in metal bars and stocked by leading glass jobbers everywhere.

Foremost illuminating engineers endorse the superiority of PRESSED LENS GLASS

over any and all other kinds of glass for ceiling lights and for the upper exterior sash on the east, south, and west elevations. It is not a matter of opinion but established fact, because other kinds of glass cannot be cleaned and lose from ten to thirty per cent in transmitted light (see folder No. D-56 —tests by Electrical Testing Laboratories of New York), while the overlapping lenses of Pressed Lens Glass pass 95 per cent of the available light, the light rays being multiplied into thousands of rays filling the room so completely that it becomes practically shadowless and without glare.



TRANSMITS THE MOST LIGHT WITHOUT GLARE AT THE LEAST COST

Pressed Lens Glass costs less than half as much as plate glass, and is thus made available for very modest school buildings.

SPECIFICATION: Sheet Pressed Lens Glass ¼ inch thickness as manufactured by the **MANUFACTURERS GLASS COMPANY, 1702 First National Bank Building, Chicago, Illinois,** to be glazed in the upper exterior sash on the east, south, and west elevations, ceiling sash under skylights, toilet room doors and windows, skylights, partition openings, and other openings as shown by plans and specifications, rabbets to be same as for plate glass.

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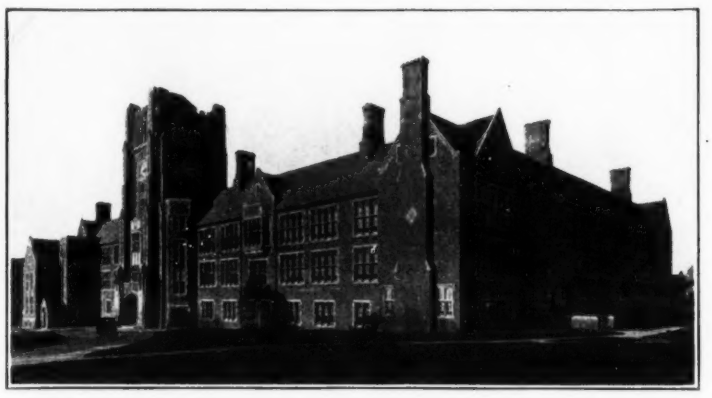

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Hundreds of school pools throughout North America are equipped with W&T Chlorine Control Apparatus.

At the recent convention of the American Public Health Association in Cincinnati, resolutions were adopted calling upon health workers everywhere to promote swimming pool sanitation in accordance with the Joint Report of the Public Health Engineering Section and the Conference of State Sanitary Engineers.

That report states: ". . . the addition of chlorine . . . by the use of proper apparatus is . . . the most satisfactory method of swimming pool disinfection."

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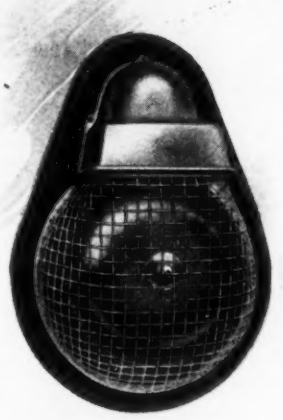
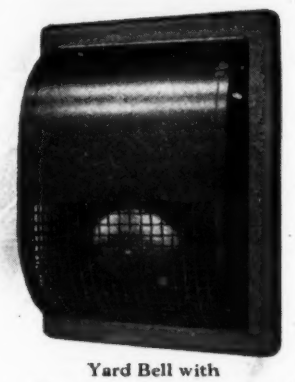


School Yard Gong



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Hood and Cage Type "D"

Type "S" Bell

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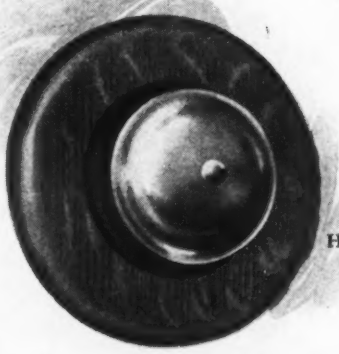
Every modern school should be provided with some means of denoting the different periods of the day's schedule.

All over the country there are thousands of schools in which Holtzer-Cabot apparatus is installed.

Full particulars will be sent upon request.



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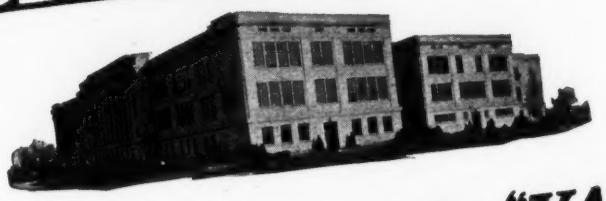


The part played by "VAN" Cafeterias is of importance to every educator~

WELL-NOURISHED bodies are needed to house growing minds! For this reason Van Cafeterias have played an important part in modern education—a part that is acknowledged and commended by leading educators.

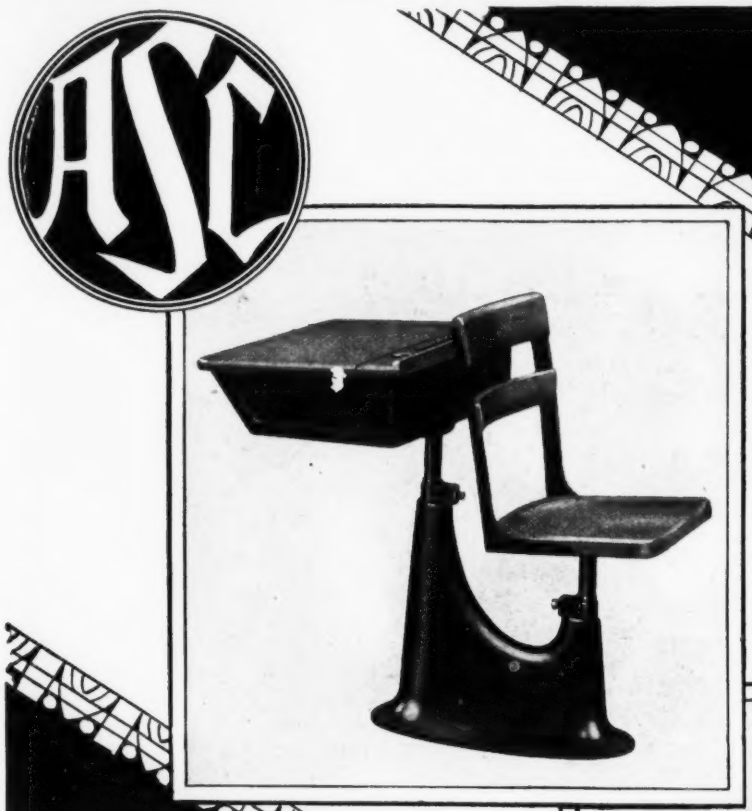
Van Cafeterias provide good food—serve it economically and efficiently—in the most attractive surroundings. In addition, Van Cafeterias, more than any other, are built to withstand the terrific use and abuse of school service.

A Van Cafeteria can be installed in an old school or a new one, in any size to meet any budget. Van Engineers will gladly lend you their experience and advice in planning your cafeteria. No doubt your Architect will also wish to consult them. This Engineering Service is entirely without cost or obligation. Write us freely.

The John Van Range Co.
EQUIPMENT FOR THE PREPARATION AND SERVING OF FOOD
Cincinnati

DETROIT
CHICAGO
LOUISVILLE
NEW ORLEANS
CLEVELAND
ATLANTA

The Van Cafeteria of the Bolton High School, Alexandria, La., is one of the country's finest. An exterior view of this splendid school is shown above.

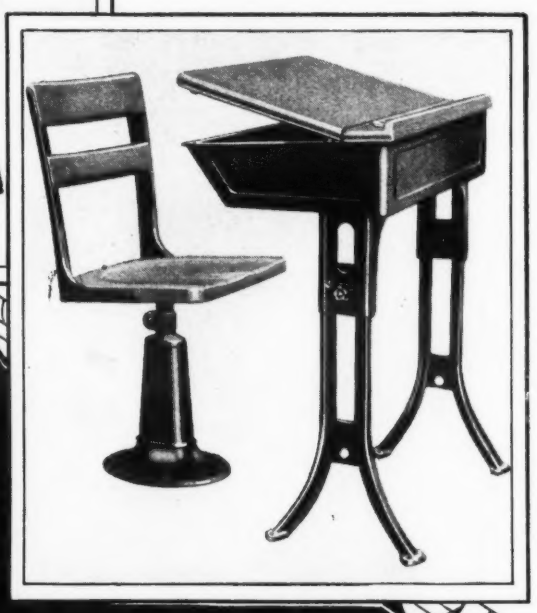


No. 104—Steel
Adjustable Pedestal
Desk and Chair

"Steel Desks Are Best!"

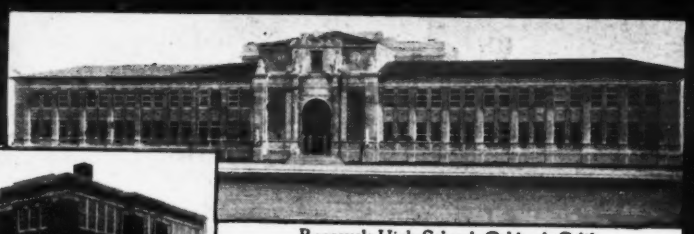
No. 174—Adjustable
Universal Tablet
Arm Chair

"Steel Desks Are Best!"

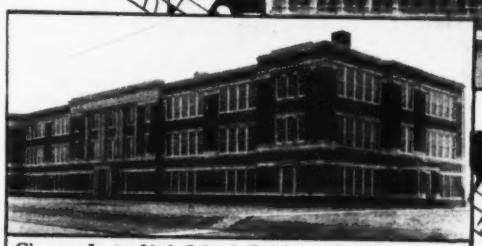


No. 135—Adjustable Universal with High School Top

"Steel Desks Are Best!"



Roosevelt High School, Oakland, Calif.
C. W. Dickey, Supervising Architect



Claussen Junior High School, Oklahoma City, Okla.
Layton, Hicks & Forsyth, Architects

Liberty High School, Bethlehem, Penn.
V. E. Ritter, Architect

Manitowoc High School, Manitowoc, Wis.
Perkins, Fellows & Hamilton, Architects

George Peabody Demonstration School, Nashville, Tenn.
McKim, Meade and White, Architects

ASC

7001-C 7000-5

Orthopedic Recommendation—

There are many school chairs on the market today for which claims of correct posture seating are extended. Correct seating is so exact a science that school boards desirous of securing posture chairs should avail themselves of the advice of competent orthopedists.

Derby correct posture chairs are constructed in conformity to the Earl Thompson correct seating patents. Derby holds sole rights under these patents which are recognized universally by the orthopedic fraternity as providing perfect reception and support to the seated body.

The types of Derby school equipment are determined from studies of school requirements. They are built for durability and appearance.

P. DERBY & CO. INC.

Chairmakers for 84 years

GARDNER, MASS.

New York City, N. Y. One Park Avenue

Boston, Mass. 197 Friend St.

Imperial DESKS for every office use

IMPERIAL DESK CO. EVANSVILLE, IND.

Give Teachers A Positive Incentive For Better Work

You will admit that tools make a great deal of difference to the craftsman or sculptor. They can not put those necessary fine touches to their work with poor tools. Their work will show a lack of class and a pardonable unwillingness to put forth more effort. The figures they sketch and mold in metal and marble show the difference.

How much like these artists is the teacher. Her job is to mold the character of the children in her charge. Only the finest tools should be hers to command. You say she has the best texts and reference books and the latest charts and maps. But how about her desk? Is it up-to-date and does it spur her on to better things? If it is an Imperial Desk it is bound to stimulate that hidden teaching talent.

Imperial Desks will improve the appearance of your classrooms and make the teachers feel the interest you take in their comfort. The faultless design and beautiful finish of Imperial Desks have made them popular in the thousands of schoolrooms in which they are being used. The teacher wants a spick and span desk that is convenient in arrangement and will not detract from the appearance of the room. She wants an Imperial—Any Imperial Desk will come up to her requirements.

When you purchase an Imperial Desk you can be positive of getting the most for your money. You have a wide variety of designs and finishes to choose from and all are moderately priced. The exclusive in-built construction features make the Imperial an extremely sturdy desk that will outlast any other desk. But the outstanding reason for their popularity is the consistent good quality that is a characteristic of every Imperial Desk. Send for the Catalog of this quality line to help you make your selection.

Imperial Desks are sold by leading School Supply Jobbers and Dealers throughout the country.

IMPERIAL DESK COMPANY

EVANSVILLE, INDIANA

Little Minds are Alert *when* Little Bodies are at Ease

The "Adjustaplex" a movable desk designed and built in perfect harmony with the modern methods of education. The movable feature permits flexible seating arrangement for group instruction. The wide range of adjustment provides correct and comfortable seating.

DESKS and chairs that are comfortable help keep young minds alert. They make teaching tasks lighter. Young folks who are not seated comfortably cannot be expected to sit quietly.

In the design of Eclipse schoolroom furniture, the Theodor Kundtz Company has put more than good value from the standpoint of wood and metal. Kundtz engineers have studied and perfected equipment which helps the child maintain correct posture.

Eclipse school furniture is available in a variety of designs and sizes, suitable for kindergartens, elementary schools, and high schools.

Write to the Theodor Kundtz Company, Cleveland, Ohio, for specific information.

THEODOR KUNDTZ SCHOOL FURNITURE

KUNDTZ ECLIPSE FURNITURE

Cleveland Ohio, U.S.A.

KINDERGARTEN CHAIRS for 1928

NEW PATTERNS IN THE STANDARD LINE

Standard School Equipment Products include furniture for classroom and office—from Kindergarten to University — a complete line in which Quality and Service are outstanding.

No. 1347

No. 1348

No. 1349

Write for our 1928 Catalogue which will be ready for distribution about January 1st. Many new and improved patterns are being shown for 1928.

These Kindergarten chairs are presented as the most approved models. Styled for health and hygiene, they meet as well the requirements of simplicity of design and sturdiness of construction necessary in a juvenile chair.

JONES The Standard Line LOUISVILLE KENTUCKY

Notice the one-piece steam-bent back slats and back posts. Other features are the deep saddle seats and backs in graduated heights. Made of Plain Oak throughout and finished in Standard Brown, dull.

STANDARD SCHOOL EQUIPMENT COMPANY

INCORPORATED

LOUISVILLE **KENTUCKY**

ALLOWS FREE SPACE FOR SWEEPING

Made in three sizes
Large
Medium
Small

No. 600, illustrating Size "A" Desk, Open Box Style

THE "ARLO"
ADJUSTABLE PEDESTAL DESK

The "Arlo" Adjustable Pedestal Desk is our latest contribution to modern hygienic schoolroom seating. A beautiful desk, both in design and finish, it is absolutely sanitary—exceedingly well adapted to the varying needs of any classroom and guaranteed to withstand the strenuous requirements of every type of classroom service.

The pedestal is made of semi-steel, constructed to give greatest strength at the points of greatest strain. The broad, massive base is cup shaped and when screwed to the floor will never pull loose.

The "Arlo" Adjustable Pedestal Desk will last a lifetime; has steel sides and back and the top is made from maple or birch, finished in Arlo Brown (American Walnut).

Adjustments are simple and easily made. Book box chair seat are independently adjustable. This is a distinctive feature and makes it possible to adjust "Arlo" desks to meet the individual requirements of each pupil.

The "Arlo" Line includes The Arlo Adjustable Pedestal Desk with Study Top, The Arlo Non-Adjustable Pedestal Desk, and the Arlo Pedestal Tablet Arm Chair.

Descriptive literature and prices on request.

Flexibility of adjustments assures each pupil being properly fitted, insuring correct posture and real comfort.

Arlington Seating Company

Office and Factory **Arlington Heights, Ill.**

COLUMBIA SANI-STEEL INDESTRUCTO COLUMBIA SANI-STEEL INDESTRUCTO COLUMBIA SANI-STEEL INDESTRUCTO

INDESTRUCTO SANI-STEEL DESKS AND CHAIRS

COLUMBIA INDESTRUCTO CHAIR DESK

Back slats adjustable; Height and tilt of top adjustable; Top leveling Device.

Large—$4.95; Medium—$4.80; Small—$4.65.

Dovetailed hardwood drawer A $1.50; Book Drawer with steel sides and bottom B $1.15; Swinging flush top ink well 15c.

The 24 good points of a school desk as established by a committee of leading educators are incorporated in this desk. They are listed here.

INDESTRUCTO'S POINTS.

1. Seat of proper height.
2. All corners rounded.
3. Seat saddled to fit body.
4. Seat of proper width.
5. Seat tilted higher at front.
6. Back tipped backward slightly.
7. Back curved to fit body.
8. Back adjustable in height.
9. Back of solid quartered oak.
10. Seat extends slightly under top.
11. Desk height adjustable to child.
12. Desk slant adjustable.
    11 and 12 constitute a Tilting Top.
13. Curved front feet give same strength and effect as separate support.
14. Desks easily moved for sweeping.
15. Noiseless, no hinges or swivels.
16. Arm rest extended backward.
17. Simplicity—Examine illustration.
18. Durability—Indestructible steel.
19. Finish, dull, lasting quality.
20. Flush top inkwell, noiseless, removable.
21. Box or sliding drawer.
    May be used on either side.
22. Nothing to catch dirt.
23. Pencil groove on top.
24. Top leveling device.

SANI-STEEL INSTRUCTOR'S DESKS

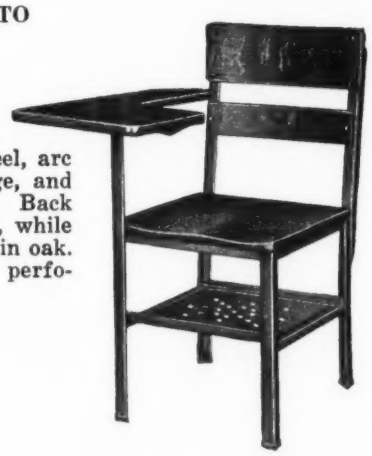
Here is a modern desk for the modern school. This desk can be had with two drawers at $13.00; with four drawers at $17.00; with five drawers at $19.50. It has a steel frame and body that is finished dark olive green. The top and drawers of fine-ply built up quartered oak, finished dark golden. Made in two sizes.

TEACHERS' CHAIR

This chair can be used for Teachers, Visitors, or the Library. It is good looking and dignified. Oak seat and quartered oak back are finished dark golden or brown. Has an olive brown steel frame. Priced at $2.85 each.

COLUMBIA INDESTRUCTO TABLET ARM CHAIR

To the right is an illustration of the Columbia Indestructo Tablet Arm Chair. The frame is of steel, arc welded to prevent breakage, and is finished in olive green. Back slats are of quartered oak, while the seat and arm are of plain oak. Price of each $4.25; with perforated shelf $.25 extra.



LIGHT WEIGHT TABLET ARM CHAIR

The illustration to the left shows our tablet arm chair of slightly lighter construction, but amply strong. Price of each $3.75.

The Columbia Indestructo line has been developed to meet the changing needs of the school. We have faithfully tried to build better and stronger desks and chairs for school use. We invite your scrutiny of any of our line. Tablet Arm Chair of slightly lighter construction, but amply strong at $3.75.

SMALL TABLET ARM CHAIR

The illustration below shows the small tablet arm chair, especially adapted for use in elementary schools. The design and construction of this chair is such that it will withstand severe usage and will meet every requirement for a tablet arm chair in the elementary schools. Price $25.00 per dozen.

COLUMBIA INDESTRUCTIBLE KINDERGARTEN CHAIR

Here is our Indestructible Kindergarten chair. It is sturdily constructed with a saddled oak seat and curved quartered oak back and a solid steel frame. Made in three sizes. One dozen weigh 110 lbs. and are priced at $18.75. Also the Elementary Tablet Arm Chair at $25.00 per doz.

COLUMBIA SCHOOL SUPPLY CO.

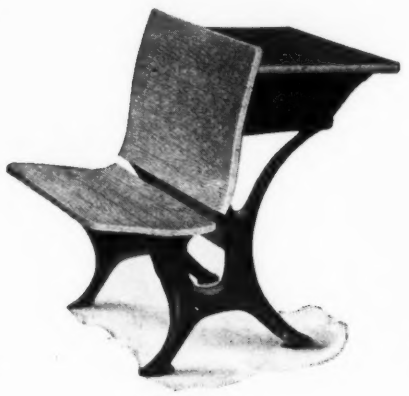
INDIANAPOLIS, IND.

A Complete Line of School Seating Equipment

No. 70

No. 1000 B

Our seating experts are at your service. Send us your specifications. We will furnish plans and make suggestions which will be helpful to you.



Panama

No. 202

THE PEABODY School Furniture Co.

North Manchester, Indiana

"Viking" Folding Chairs — Mean Fewer Replacements

"Viking" Indestructible Folding Chairs cost little more than the ordinary wooden chair.

They're Indestructible

You cannot afford to be buying new chairs every few years. It's too expensive a proposition. Why not install "Viking" Chairs that will last a lifetime? You can't break them or bend them out of shape. They're built entirely of 20 gauge steel and reinforced at all the vital points. This all-steel construction likewise makes "Viking" fireproof and absolutely dependable under trying conditions.

Comfortable, Too

Besides being rugged and strong "Viking" chairs have been so designed that comfort is also a paramount feature. It has been built into these chairs. With their inclined backs, "Vikings" insure that perfect comfort which is not to be found in any other folding chair. The fibre seat and the full upholstered seat provide an extra amount of comfort.

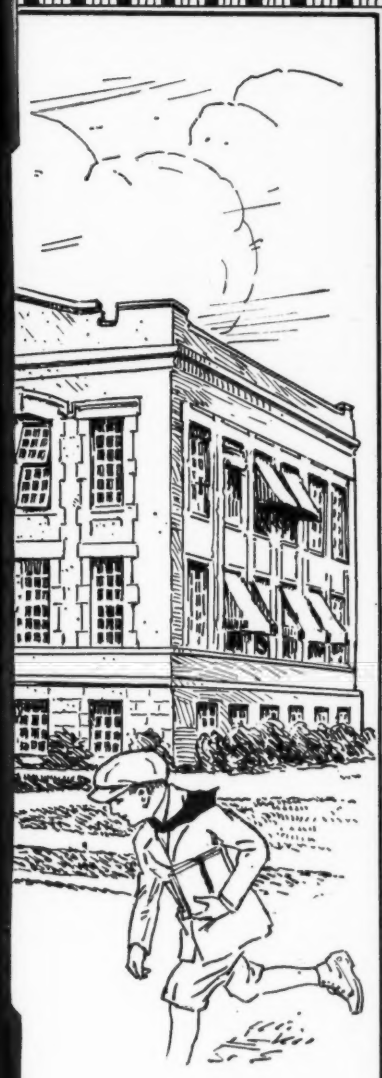
Write for complete information.

MAPLE CITY STAMPING CO., Peoria, Ill.

STERLING LIFELONG BLACKBOARD

Guaranteed for the Life of the Building

Another Sterling installation—Phillips Hall, University of North Carolina, Chapel Hill, N. C. 4,983 square feet of Sterling Lifelong Blackboard installed for a lifetime of service. Atwood & Nash, Chapel Hill, N. C., Architects.



Your *first* cost is practically your *last* cost.

Sterling is going forward with startling strides. Everywhere—every day more and more Sterling Lifelong Blackboard is installed. In better schools—throughout 39 states and Canada—hundreds of thousands of feet of Sterling is giving sterling performance, year in and year out.

Guaranteed for the life of the building—with the reputation and good will of a 46 year old institution squarely behind that guarantee. A permanent investment that has proved its worth time and again to school boards—Sterling's *first* cost is practically your *last* cost.

Black—and black all through. A finer writing surface, and a body that seasons and improves with age. Warp and buckle proof—strictly fireproof.

Leading architects and contractors specify Sterling. School boards protect themselves—and their budgets by insisting upon Sterling. If you don't know all about this nationally accepted Blackboard, you should get the facts now. Use the coupon below.

Weber Costello Co.

Chicago Heights — TIME TESTED W.C. SCHOOL SUPPLIES — Illinois

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Gentlemen: Please send me *Free of all charge* detailed information on *Sterling Lifelong Blackboard* and why it is being installed in the new and better schools everywhere.

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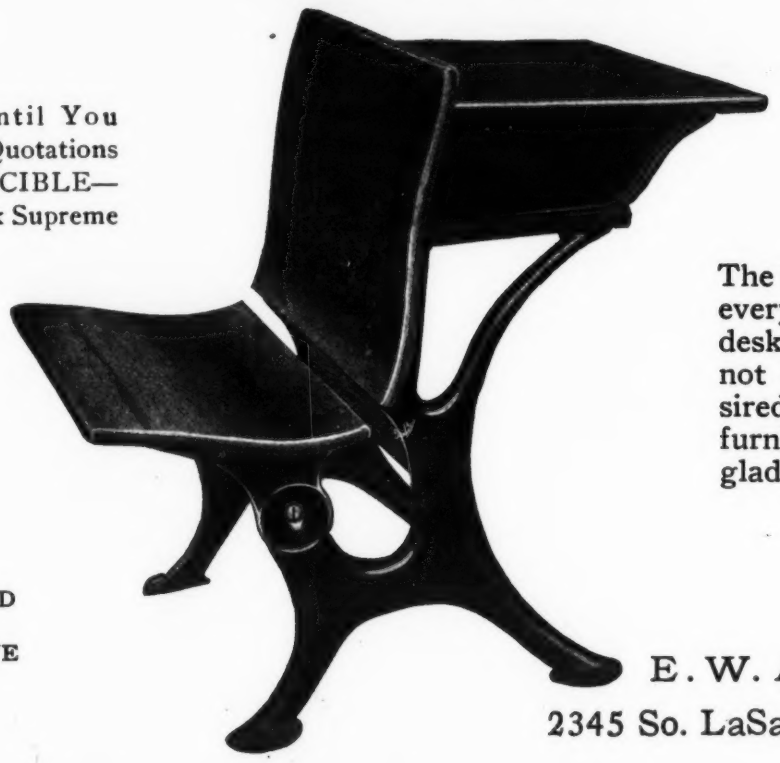
INVINCIBLE

TRUE TO NAME

Don't Buy Until You Have Obtained Quotations on the INVINCIBLE—The School Desk Supreme

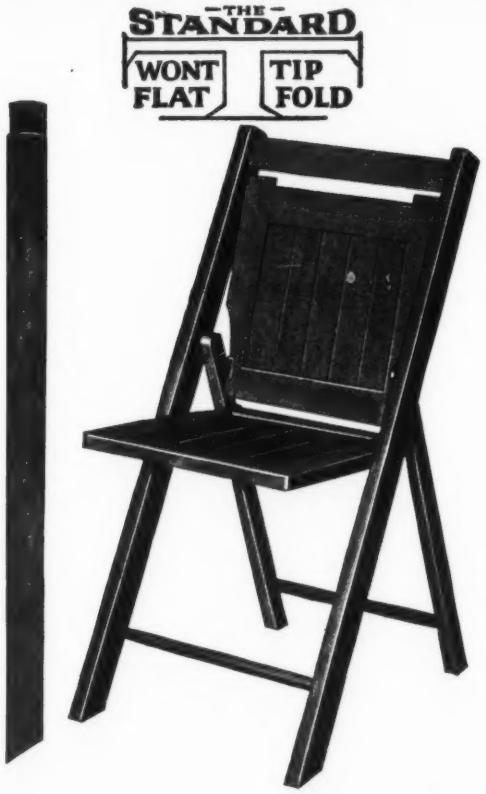


The Rowles Line embodies every practical type of desk. If the Invincible is not the type of desk desired send for our complete furniture catalog. We will gladly mail it on request.

GUARANTEED FOR TWENTY-FIVE YEARS

E. W. A. ROWLES CO.
2345 So. LaSalle St., Chicago, Ill.

Stacks Flat for Convenience of Storage

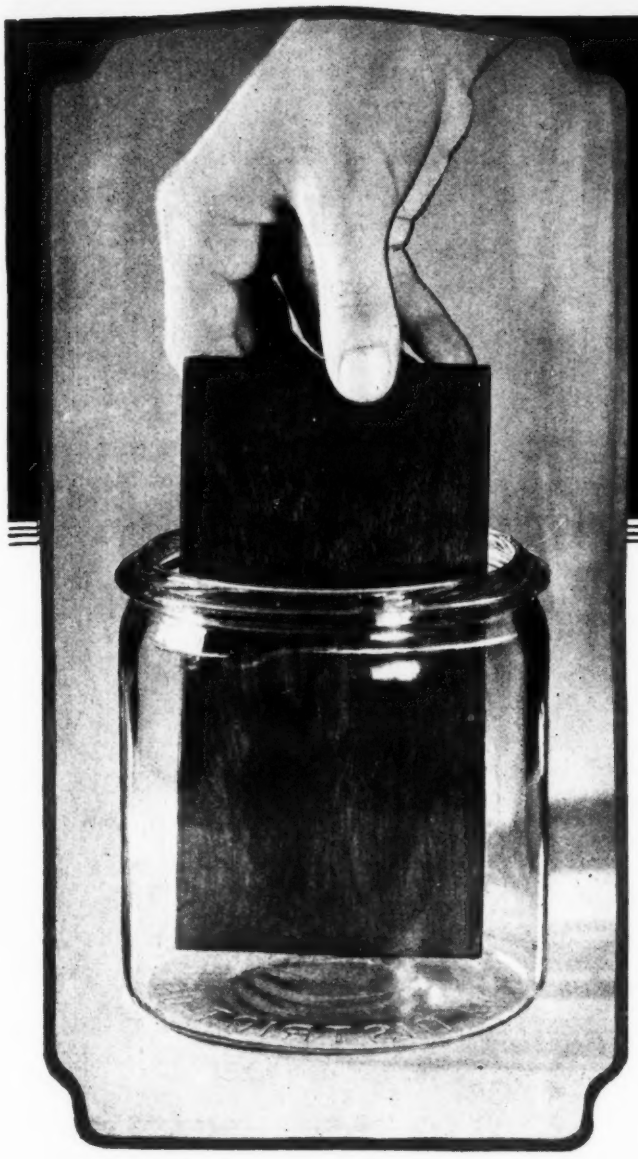


THE compactness with which the Standard Non-Tipping Chair folds represents economy, in that very little floor space is required for storage.

Many advanced features only to be found in the Standard Chair Line developed through our years of exclusive chair manufacturing will add many years of service to your seating problems.

Standard Folding Chairs are made in a variety of styles, write for descriptive catalogue and prices.

Standard Manufacturing Company,
Cambridge City, 1020 S. Foote Street Indiana, U. S. A.



A Wonderful FINISH *for School Desks!*

Permanently Water-proof
Practically Scratch-proof

Soak it in water, as long as you like—

Scratch it in any way that could be possible under ordinary school usage—

You will find that you will make no impression on this remarkable finish.

A Richer, Deeper Wood Color With a Velvety "Feel"

With this new National Tannic Acid Finish, the tannic acid in the wood is brought to the surface, bringing with it the natural color of the wood. The finish is developed within the wood fibre—it consequently cannot wear off nor rub off; it will never fade nor discolor.

The finish is both "hard" and "elastic"—two properties long sought but never before accomplished in a finish; it is also transparent.

It produces a soft shade of brown, very pleasing and restful. It will harmonize with any modern interior finish.

This process not only gives a beautiful finish, but protects the wood from injury as no other method can. Woods treated by this process wear longer and retain their original finished appearance better than with any other finish.

A Complete Line of School Desks

We are manufacturers of complete seating for schools—famous for years as National "Seats of Comfort." In many of the large schools of the country, every seat is a "National."

Our line includes desks equipped with the famous Moeser Extended Arm, insuring correct posture and greatly increased efficiency in work.

New National Pedestal Desk

A favorite where fixed seating is required.

It has the Universal adjustment, that is, vertical and horizontal in ONE operation. To adjust it, merely loosen the set bolt and raise or lower the desk to the height desired. There is no "play" in the joint when locked.

The seat and back are shaped to conform hygienically to the human figure, and afford the maximum amount of comfort.

This is but one of many designs we manufacture. Send for our Catalog and Circulars.

The National School Equipment Co.

Manufacturers of Complete School Equipment

PORT WASHINGTON, WIS.

NATIONAL School DESKS

"Famous for Comfort"

ALGOMA TABLES

Manufacturers of

Coat and Hat Racks
Costumers
Dining Room and
Drop Leaf Tables
Service Stands
Etc.

STYLE No. 650
Sizes
30"x48" 30"x72"
30"x60" 30"x84"
30"x96"
Standard Height 30"

FOLDING TABLE.
Whitewood or
Solidwood Tops.

Folding Kindergarten
Tables made as per
your sizes.

SPECIALISTS IN
RUBBER AND
LINOLEUM
TOP TABLES.

WRITE FOR
FURTHER
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ALGOMA WOOD PRODUCTS CO.

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Algoma, Wis.

READSBORO CHAIR COMPANY

READSBORO, VERMONT

"READSBORO" FURNITURE — QUALITY and SATISFACTION

PORTABLE ASSEMBLY SEATING

SINGLE FOLDING CHAIRS

TABLET ARM CHAIRS

KINDERGARTEN FURNITURE

No. 1019

No. 461

SCHOOL DESKS and CHAIRS

SUNDAY SCHOOL FURNITURE

FOLDING TABLES

JUVENILE FURNITURE

SALES ROOMS:

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204 East Jefferson St.
TRENTON, N. J.
206 West State Street

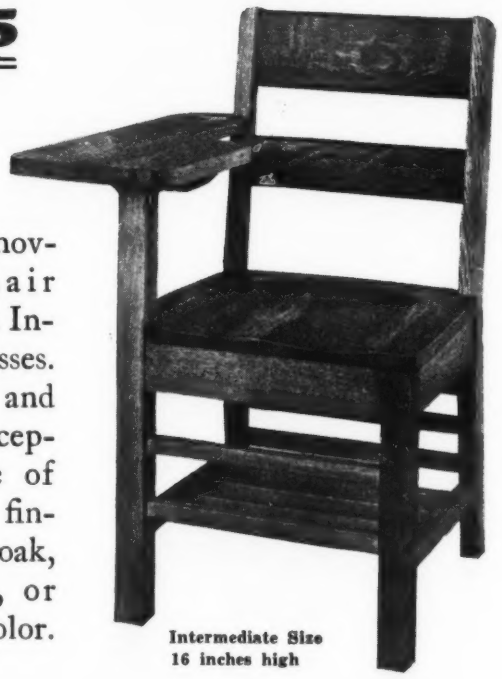
Send for bulletins, prices, and full information.

Sturdy School Chairs

AT LESS THAN WHOLESALE PRICES

$4.95

A MODERN, movable chair for Junior and Intermediate classes. Writing arm and book rack. Exceptionally made of selected oak, finished in light oak, golden oak, or fumed oak color.



Intermediate Size
16 inches high

Reischmann
CHAIR COMPANY

135th ST. & WILLOW AVE., N. Y. C.

BEACON FOLDING CHAIRS

Model — Seat and Back
No. 10 Wood
60 Black Leatherette
70 Fancy Leatherette

Made in a variety of colors.

Model — Seats Only
No. 15 Wood
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Also made in Kindergarten Size.

THE GENUINE comfort afforded by the new Beacon Folding Chairs results mainly from a feature which has never before been available in steel-frame chairs — generously proportioned and properly tilted backs, designed to support the spine and kidneys. Contributing further to this comfort are seats of ample dimensions, and a rigid all-steel frame which prevents wobbling or tipping.

The Steel-Frame Chairs with Comfortable Backs and Seats
COMBINED WITH
Strength—Backed by a Five-Year Guarantee

BEACON STEEL FURNITURE CO.

Sales Representative

WM. H. WARK

Factory
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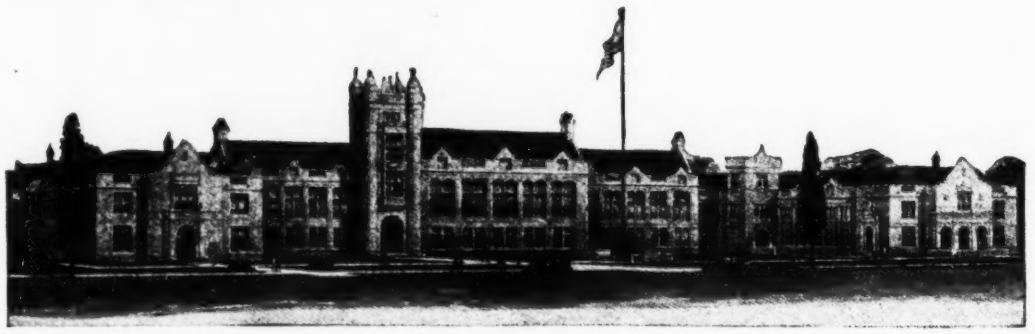
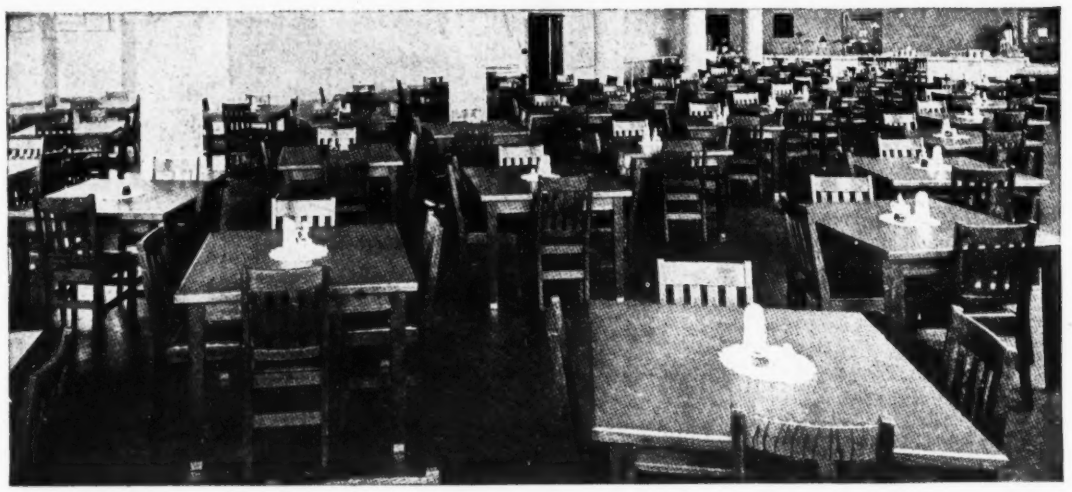
1410 SO. WABASH AVE. - CHICAGO.

GUNN "LINO" Trademark Reg. DESKS and TABLES for SCHOOLS



Fordson School, Fordson, Mich. H. J. Keough, Architect.



"LINO" Desks for Teachers

"LINO" Tables

are popular for

Cafeterias-Libraries and All Departments

Quiet - Pleasing
No breakage of tops.

Our ***New Two Color Tops*** are exceedingly decorative.

Catalog and Sample of top on request.

The Gunn Furniture Co.
Grand Rapids, Mich.
40 Years Builders of Desks and Tables

Royal modern school seating is supreme

Pattern No. 32

Laboratory Stool F.S.1

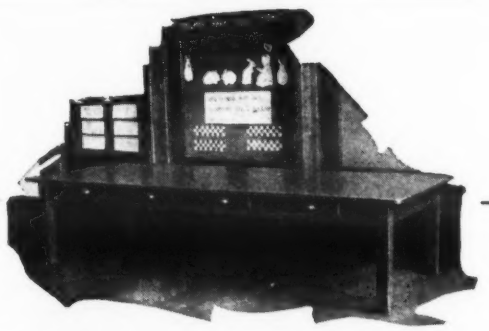
LABORATORY STOOLS
FOLDING CHAIRS
KINDERGARTEN AND LUNCH ROOM FURNITURE

Folding Chair No. 128

Royal School Furniture has built an enviable reputation for strength, posture, comfort, and finish. Thirty years of experience in the manufacture of Metal Furniture and the designing of seating to meet special requirements is reflected in the superiority of present-day Royal School Furniture.

Samples sent for free trial at no expense—no obligation.

ROYAL METAL MANUFACTURING CO.
METAL FURNITURE SINCE '97
1130 South Michigan — Chicago, Ill.



Note These Improvements

1. ***Numerous betterments on the under frame, including metal corner irons and other strengthening features.***
2. ***Beautiful 5-ply top—it stays "put."***
3. ***Lacquer finish.***

The ELGIN SCHOOL TABLE is now, more than ever, a permanent investment and represents a real value. Schools the country over are demanding this equipment to meet present-day standards in the seating arrangements of their first and second grades.

Send for free booklet, "Seating Efficiency."

RINEHIMER BROS. MFG CO.
ELGIN, ILL.

DEPT. OF SCHOOL FURNITURE

ELGIN SCHOOL TABLE

ESTABLISHED SINCE 1857

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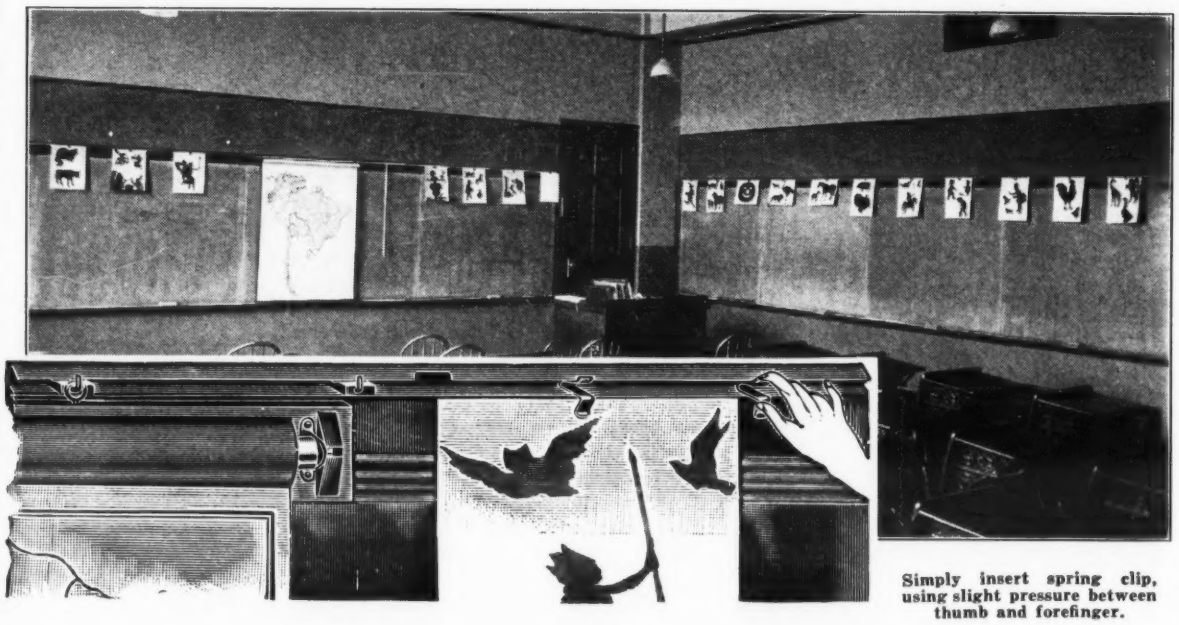

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LEADING ARTICLES

The Supeintendent of Schools and the New School Building 39
James O. Betelle
School-Building Competition 41
Charles Butler
High Quality in Small Schoolhouses 43
Morris W. Maloney
Corridor Ventilation 45
Samuel A. Challman
Factors Determining the Size of a High-School Building 46
James M. Turner
The School Ventilation Studies of the New York Commission on Ventilation 57
Thomas J. Duffield
An Achievement in School Construction 60
Virgil L. Johnson
Wilson Junior High School at Erie 68
G. O. Moore
How Los Angeles Builds Schools 73
O. H. Barnhill
The High-School Library 74
William C. Giese
Cost Plus System of Letting Contracts for Schools 75
Warren S. Holmes
What Teachers Want in School Buildings 76
J. E. Fearon
The Control of Light in Classrooms 77
Lawrence Louthian
Development of a Building Program in a Rapidly Growing Community 78
W. R. McCornack
School Building in Arkansas 88
C. M. Hirst
Then and Now in School Finance 101
Charles Black
The Problem of Flooring in Schoolhouses 136
Julius W. Miller
Index of School-Bond Prices 185
Harold F. Clark
Schedule of Standardized Rooms in Academic High Schools, New York City 190
Wm. H. Gompert

EDITORIALS

School Costs in Their Relation to General Municipal Costs 90
The Mission of the Modern School Architect 90
Prison-Made Furniture and Supplies for the Schools 90
School-Board Elections and Popular Suffrage 91
Modern Means and Types of School Publicity 91

PLATE ILLUSTRATIONS

Wm. B. Ittner's Suburban Schools Around St. Louis 48
Emily Grant Hutchings
Columbia High School, South Orange and Maplewood, N. J 52
Clifton Avenue Grade School, Lakewood, N. J 56
Guilbert & Betelle
Overbrook Senior High School, Philadelphia, Pa 65
Simon Gratz Senior High School, Philadelphia, Pa 67
William T. Tilden Junior High School, Philadelphia, Pa 67
Designed by and Erected Under the Supervision of the Department of Buildings, Philadelphia Board of Public Education
Wilson Junior High School, Erie, Pa 68
Meyers & Johnson
Gardena Elementary School, Los Angeles, Calif 72
Designed by the Business Department, Los Angeles Board of Education
Boulevard Grade School, Noble Road Grade School, and Fairfax Grade School 81
Franz C. Warner
John Harris High School, Harrisburg, Pa 83
Lappley & Hornbostel
William Penn High School, Harrisburg, Pa 85
C. Howard Lloyd

NEWS AND NOTES

News of the School Boards 104
Building News of the Schools 110
Washington Correspondence 120
A. C. Monahan
School Law 122
School Finance and Taxation 125
Teachers and Administration 126
School Hygiene 148
Chicago Correspondence 154
Book Reviews 181
School-Building Programs in the Cities of the United States 189
Buyers' News 206

American School Architecture

A BRITISH statesman in a public address recently said, that there is no opportunity in Europe for the expression of modern architectural genius. "Our temples are built and the world comes to admire them. But we cannot build new ones. We are not permitted to improve upon them. Architectural effort has come to a standstill."

In America, however, there is a wonderful field for new achievements in architecture. And what magnificent things are being done there! What marvellous structures are being reared! In any discussion on American architecture the American schoolhouse must be given a leading place. There are constantly being reared in this country great hotel buildings, apartment houses, bank edifices, business blocks, and private homes, but the schoolhouse takes a prominent rank in a list of new structures.

In fact, the American schoolhouse has enabled the architectural genius to rise to some of the finest expressions of that noble art. The number of new structures called for, together with their great size, has enabled the architect to plan and devise the most utilitarian and, at the same time, the most beautiful schoolhouse the world has ever seen.

One of the gratifying characteristics of this country is that the community gives vent to its local pride and patriotism in a magnificent school structure. It cannot deal in monster hotels, railway stations, or skyscrapers, but it can indulge in a schoolhouse that embodies beauty in design, and grace in outline.

Thus, if American genius finds new forms of expression over the old in architecture, it is safe to say that the American schoolhouse exemplifies that genius in an eloquent manner. If, as the British statesman holds, there is an opportunity to rear new wonders in a new world, then it also follows that the American architect has not failed us.

The American school structure, of the modern type, is an achievement which has not been excelled, or even matched, by any other country on the globe. It is unapproachable in utility, in beauty, and dignity.

THE EDITOR.

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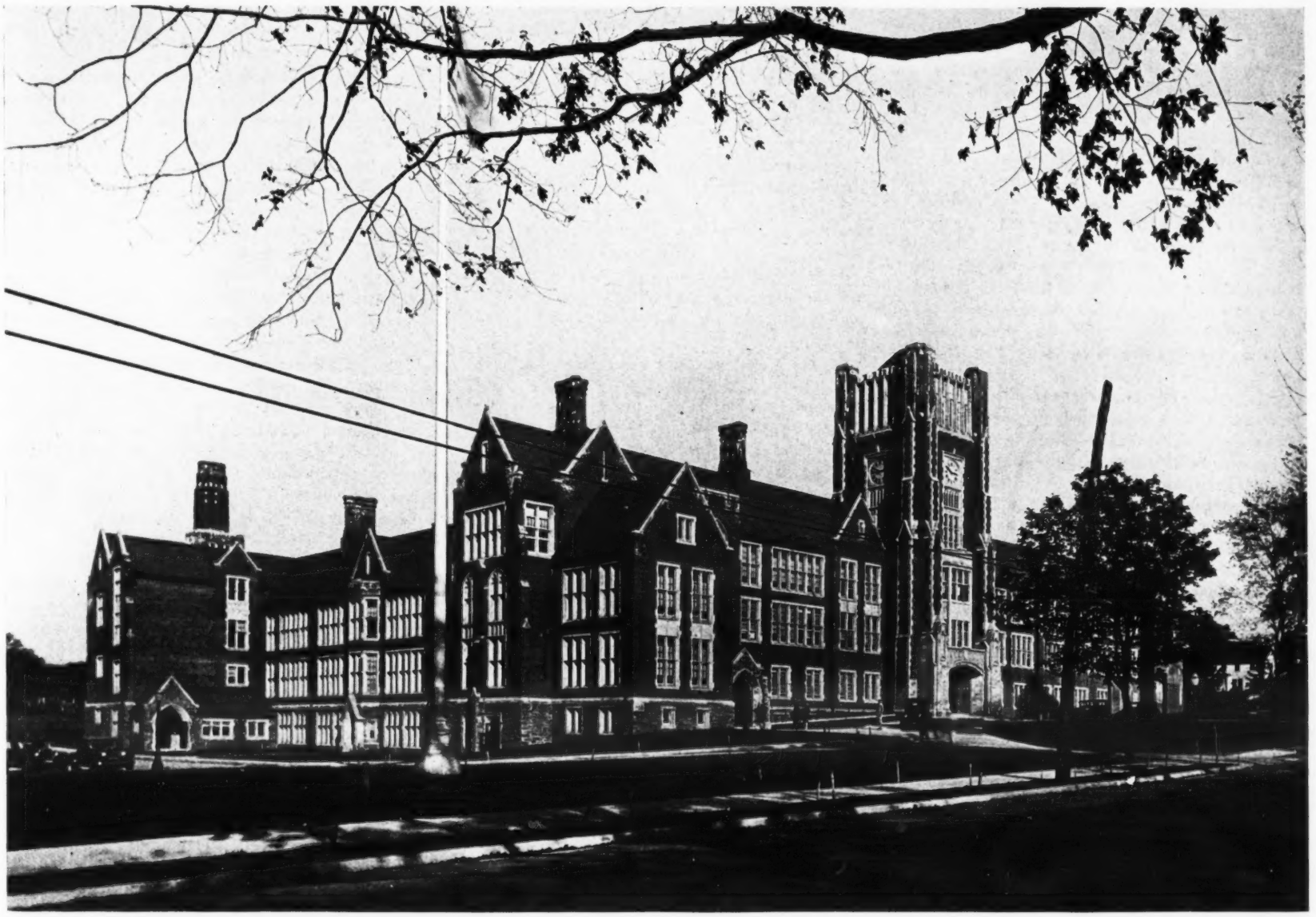


COLUMBIA HIGH SCHOOL, SOUTH ORANGE, N. J. Guilbert & Betelle, Architects, Newark, N. J. (See Pages 52-55)

The Superintendent of Schools and the New School Building

James O. Betelle, of the Firm of Guilbert & Betelle, Architects, Newark, N. J.

The superintendent of schools in a community which is about to build a new school, or in one which has a school-building program in hand, is in a position to render constructive services in lines beyond his strictly educational duties. The board of education, which is in charge of the erection of the school building, should depend upon the superintendent to guide the members in the erection and planning of th schoolhouse, just the same as they depend upon him to guide them in educational affairs. The school superintendent should, therefore, have the faculty of leadership, and not only know in its smallest detail the educational work, but should have the knowledge of the fundamentals of school-building planning.

It is to be regretted that occasionally a school board takes it upon itself to erect a building, ignoring the superintendent entirely; and it is unfortunate at other times that a superintendent knows the educational work but is quite ignorant about building construction or the planning of schools. Both of these situations are deplorable and do not lead to the best results.

It is much to be desired that there be a closer relationship and acquaintance between the superintendent of schools and the architect for the new school building. It is not the purpose, however, to suggest that architects be made out of superintendents nor that superintendents of schools be made out of architects. Each is a highly complicated specialty, but the architect and the superintendent should know something of each other's problems, in order that they may confer together intelligently. If this is the case, there is a sympathetic understanding and each party attends to his own duties, but at the same time confers and collaborates with the other.

The superintendent should have that quality of leadership that makes him a real force in the community. He should be consulted and be able to advise intelligently on the proposed site for the school building from the educational standpoint; that is its location and availability with regard to the school population. At the same time the architect who will later design the building should be available to advise regarding the site from a building standpoint. With these two opinions before them it becomes the problem of the board of education to decide on the merits of the various sites proposed and to make a decision, which they can then do intelligently.

The Educational Basis of Planning

With regard to the planning of the schoolhouse itself, the superintendent of schools must first have in mind what his school organization and course of study are going to be. It has been my experience that most superintendents are very undecided as to just what they are going to teach in a new building, and

rather prefer to wait until the new building is erected before they make up their minds. Sometimes the members of the school board are reluctant to discuss or authorize changes or expansions in the courses of study which the superintendent recommends, until they actually see the building completed, as they are unable to visualize the new situation from the plans. No good school building is ever erected without having it known in advance what it is intended to be used for, any more than a good factory is built without the owner knowing what he intends to manufacture in it, how he intends to do the manufacturing, and the different processes and routine of operation which he expects to be carried on.

After the superintendent has decided what is to be taught in the building, it is then necessary that he get up a tentative program, outlining in some detail the scheme for running the school, from which he will be able to determine the number of rooms and various types and kinds that will be needed in the building. It is to be regretted that school buildings are oftentimes built first, and the school program is fitted to them afterwards, whereas the reverse is the proper procedure. That is, the school building should be built to fit the program of teaching, but at the same time it should be made flexible enough that changes can be made and additions erected that may seem desirable, as educational methods progress with the passing of time.

The plans and specifications for school buildings are always submitted in sketch form to begin with. This is the time the school superintendent should give serious study to the layout of the plans and to the materials to be employed in the construction of the building, with a view of making rearrangements and changes which will meet with his educational requirements. The time to make changes and improvements is when the plans are in sketch form, and the sketches submitted by the architect should be studied and changed until they are absolutely correct, and will meet with the approval of both the superintendent of schools and the board of education.

The Seriousness of Studying Sketch Plans

After these sketch plans and general specifications have been adopted by the board of education, the architect can proceed with his working drawings and final specifications, which will follow out in detail what has been decided upon on the sketches. After the working drawings have been started, or are well along, it is no time to think of changes, because the time for changing is past, except in the most minor details. The time for changes was when the plans were in sketch form, and to make radical changes when the working drawings are in the process of being made means delay and also cost to the board of education, in causing work to be done over. There are refinements and minor adjustments that can be made as the working drawings are proceeded with, and the superintendent of schools should visit the architect's office from time to time to see that the working plans are not only reproductions of the sketches, but are improvements on them in many details.

While the superintendent of schools should be familiar with schoolhouse planning, he should not presume to exercise any of the functions of the architect, nor to assume any of the latter's responsibilities. It is a superintendent's duty to pass on the general outlines and layout of the building. He is not qualified to pass on materials or methods entering into the structural safety of the building. As stated before, if he is fully informed in educational work, this subject alone is sufficient to take all of his time and effort, without assuming any of the architect's duties or responsibilities. Conversely, the same applies to the architect. The latter should not presume to tell the superintendent how to conduct his office, yet he should know enough of school routine and management to interpret the superintendent's requirements and to improve on the superintendent's suggestions when incorporated into the plans of the building.

The superintendent should not only go over the arrangement of the rooms, etc., on the plan, but he should also go through the memoranda specifications submitted with the sketches, to see what materials are to be used and where. It is to be regretted that it often happens that school superintendents and school boards do not examine the plans and specifications in the early stages carefully enough, and when the building is finished or nearing completion, they find many surprises. At this stage of the construction of the building it is too late to make changes without involving additional cost. So a superintendent should review the preliminary specifications to see what rooms have wood floors and the kind of wood floors; what rooms have cement floors; what the finish will be in the shops, in the auditorium, and in the gymnasium; what walls will be plastered or painted; and all the other innumerable details that will occur to him later on, and should occur to him at the time the plans are being made if he hopes to see a satisfactory and complete building.

The Furniture and Equipment Layouts

Another important item that the superintendent should have in mind at the very start of the work is the furniture and equipment. No school building should be planned without having the furniture laid out in all special rooms, at the time the sketches are made. It too often happens that rooms are designated for specific purposes, and later on when equipment is to be selected, it is found that the rooms are not of sufficient size to accommodate the furniture or, if of sufficient size, they have not the proper shape to take the furniture to the best advantage. In making room layouts for furniture, the superintendent and architect should not be expected to know the subject in all its intimate details, and they should not hesitate to confer with the supervisors and teachers and the equipment dealers as to the layout of the furniture for the laboratories, shops, cafeterias, etc. The layout of the furniture, when decided upon, should be shown on the working drawings, and adhered to in the equipment of the building. Not only is it necessary to have this furniture and equipment laid out to see that the room is of the proper size and plan, but the layout is absolutely necessary so the architect may properly locate the various electric, plumbing, heating, and water outlets and the vent flues, etc., required in these special rooms.

It should be realized by the superintendent that his only obligation is to set forth in a general way the requirements for the building from an educational standpoint. Examination of the plans and specifications does not place upon him the responsibility for their completeness, correctness, or the safety of the building. All of these elements are obligations and responsibilities of the architect, and the superintendent should know where his responsibility ceases and the architect's begins.

The superintendent of schools is fortunate when the architect employed by his board of education is one who has specialized in schoolbuilding construction, or who has built a number of successful school buildings. With the architect familiar with the school problem or with experience in the erection of a number of schools back of him, and with the superintendent knowing the educational requirements of the community and their needs, as far as the building is concerned, the successful outcome of the new school building is practically assured. Should it happen that the architect employed by the board, and with whom the superintendent is asked to work, has built no schools before, the superintendent is going to be in a difficult situation, because no matter how well the superintendent is informed on the educational requirements of the new school building, he is under a great handicap in obtaining the desired results. The designing of school buildings has developed into a specialty, and no architect, no matter how great his ability, can erect a successful school the first time. In fact, after an architect has actually built hundreds of schools of different types and sizes, improvements and betterments will still be made in each succeeding building, although many of the first mistakes and shortcomings will have been overcome.

Use of Teachers' Recommendations

In the conferences between the architect and the superintendent regarding the plans and specifications for the new school building, the teaching staff, the heads of departments, and the supervisors should not be ignored. If real progress is to be made in schoolhouse planning, the suggestions and recommendations of the teachers who actually live in and use the buildings which are erected, must not only be obtained, but should be considered and followed, where, in the judgment of the superintendent, it may seem wise to do so.

It is also one of the duties of the superintendent of schools to recommend and encourage in every way possible, sufficient funds for the erection of the kind of building that the community requires. To do a thing well naturally costs considerable money, and as the authorities in charge will probably be abused in any case, they might as well be abused for doing something well. Superintendents are prone, like many other people, to feel that they can do a great deal more with a stated sum of money than they really can, and it is to be regretted that some architects, in order to get a contract, encourage them in this belief.

Before an appropriation is made for a school building, the superintendent should recommend that tentative sketches be made to determine the size of the building and its probable costs. The amount of money to be asked for to build a school building always seems enormous, and unless sketches are prepared, showing the size of the building and the accommodations and content, it is very likely that the amount asked for will be reduced somewhere along the line. If sketches are prepared, the superintendent and school board are in a position to defend their request, and to prove to the appropriating authorities that the money asked for is actually needed, and unless it is provided it will mean a curtailment in the school facilities, which is not desired.

The obtaining of sketches for the building should not be confused with a competition for the selection of an architect. It is assumed that the architect has been selected, and that in case the building does not go ahead he will be paid a reasonable fee for the preliminary work, which was necessary and used to put the matter intelligently before the voters or other proper authorities.

It occasionally happens that an architect is employed and working drawings are made, and actual estimates obtained before the appropriation is made. This is a very desirable method of handling the problem, if the proper authorities can be depended upon later on to make the necessary appropriation. In public work this oftentimes cannot be done. There is a suspicion that, if the school board is given a free hand and allowed to design the building it desires, there will be a temptation to be extravagant both in materials and size, and the building

(Concluded on Page 177)

School-Building Competitions

Charles Butler, F.A.I.A., New York City, Member of the Committee of Competitions of the American Institute of Architects

When funds have been voted for the erection of a school building, the next step which the school board must take is to select an architect who will design the building and supervise its erection. This selection can be made in one of two ways. Probably the most satisfactory way is to select the architect on the basis of his ability, organization, and experience. It often happens, however, that a direct selection cannot be made because a number of candidates are in the field. It then seems advisable to hold an architectural competition as the most certain and fair means of making a choice.

If it is determined that a competition shall be held, it is of course also desirable that it be conducted in such a way and under such regulations as will bring about the best results. Experience in competitions over a period of years has caused architects to standardize the proper procedure and regulations, and these details will be set forth a little farther along in this article.

Every school board naturally wants to secure the finest and largest possible school building for the money available, and each and every architect who is in touch with the board feels that he is the man best qualified to do the work. It is also obvious that the board wants to see plans prepared for the site selected and will not be satisfied to examine merely plans and photographs of some other building.

Past Performance as a Test

It is very probable that the best results would be secured if a small committee of the board were authorized to make a tour of inspection to other towns and visit schools designed by different architects. Such a procedure would accept the principle that past performance is one of the best tests in any line, and that an architect who has erected a satisfactory school in other towns can undoubtedly design a satisfactory building for the community in question. It rarely happens that this system of the direct selection can be adopted. Often, on account of the insistence of the architects interested, who feel they should be allowed to present their projects for the building under consideration, the board follows the line of least resistance and announces that all architects desiring to submit sketches may do so. Then the fight is on.

The board naturally feels that the more architects competing, the better chance there will be to get a good building; that if 25 sets of plans are received, the more likely a fine school will result than if selection were limited to, say, half a dozen plans. And these assumptions are perfectly natural for anyone who has never studied the results of competitions and who is not familiar with the mental processes of architects and their financial conditions.

As a matter of fact, when an experienced and established architect considers taking part in an open competition he begins by calculating how "long a shot" it is. A 25-to-1 shot does not look very good. Consequently, if he has a fair amount of work in his office, he either turns down the proposition as bad business or, because he is a friend of somebody on the board, he makes sketches and drawings in a hurry and sends them in.

On the other hand, if the architect is very young and enthusiastic, or has no work in his office, he may devote considerable time to the preparation of drawings, on the theory that he might as well "take a flyer" as remain idle. As a result, an open unpaid competition, such as is frequently held for a school building, attracts as serious competitors only those who for one reason or another have little work and whose time for the moment at least has but slight value. This is obviously not the outcome hoped for by the school board.

The Limited Competition

In order to get a really enthusiastic response in a competition, the "game" must be made attractive to the men who are most competent and whose work is most in demand. The only method by which this result can be attained, without very considerable expense, is to hold a limited competition. This means that the board must go to the trouble of looking over the names of those who desire to compete and must decide which among them it would be willing to engage for erecting the building, if they should win the competition.

It is inevitable that a board will offend some of its fellow citizens by refusing to let them enter a competition. But, when we consider the trouble which has arisen as a result of a policy which permits somebody who is a friend of somebody else to compete merely through good nature, it is plain that the board will save itself trouble in the end by a more careful scrutiny of the qualifications of competitors at the outset. It is no kindness to a young architect to let him into a competition, if the members of the board are unwilling to let him do the work in case his design is considered the best.

Four Essentials of a Competition

Now let us consider the position of the architect who is a member of the American Institute of Architects and who desires to take part in a school competition. The institute has not many rules in regard to competitions, but it does insist that none of its members shall take part in a competition unless at least four minimum conditions are complied with. These conditions briefly are: (1) That a professional advisor shall be in charge of the competition, (2) that at least one architect be on the jury of award, (3) that the drawings be submitted anonymously, and (4) that the competition involve a contract for the services of the architect selected by the jury or by the board, if the jury cannot legally make the final decision.

These requirements seem to architects to be reasonable enough. There should be a written program for every competition, and this program can best be drawn up by an architect in consultation with the board. Architectural requirements for a building to be stated accurately and comprehensively in a program must be set forth in technical language, and it is just as reasonable to ask that the program for a competition be written by an architect as that the contract for the purchase of a piece of property be drawn up by a lawyer. In the course of a competition, questions are certain to arise, and these should be submitted to one person only—the professional advisor, acting as representative of the board. To insure the fair play which is essential in any competition, it is necessary that the professional advisor issue the questions and answers to all competitors, so that all are on an equal footing.

The professional advisor performs many other services. It is his duty to examine the list of applicants and to refuse permission to compete to those who lack proper experience. In this matter the advisor acts as a buffer between the applicants and the board, and saves the board members the embarrassment of personally denying permission.

The Jury of Award

The stipulation that there be at least one, or preferably more, architects on the jury does not mean that architects need be in the majority. While the average school board has a good idea of the requirements of a proposed building, the members are not always skilled in reading plans and here the services of one or more architects are of very real value. For the architects will see at a glance faulty details and discrepancies between plans and elevations; they will also warn the board members against plans which may be very charming in appearance, but which depend for effect on costly materials and decorations in excess of the appropriation available.

In other words, the architect members of the jury serve as guides to the lay members, and frequently are of service in preventing them from being carried away by drawings which would not in execution secure the best building.

The services of a professional advisor may at times be secured without compensation. In any event, it is safe to say that the advisor saves the board far more in time and responsibility than the small fee he may receive. As for the architectural jurors, their services usually may be obtained for a nominal fee or even without pay.

The requirement of anonymity is often a stumbling block. The board feels that it should not be hampered in its desire to talk over the problem with the competitors, and justly so. On the other hand, architects know that the best talker is not necessarily the best designer nor the most practical planner. A fair compromise results in the privilege given to each competitor to meet the board before the program is issued, and to discuss with its members the requirements of the school. When once the board has decided that a certain architect by his experience and ability, as demonstrated to them, is qualified to compete, there is no further need of personal contact. As a matter of fact the choice from that point on should depend wholly on the plans submitted. In order that all those admitted as competitors shall be on an equal footing, anonymity is essential.

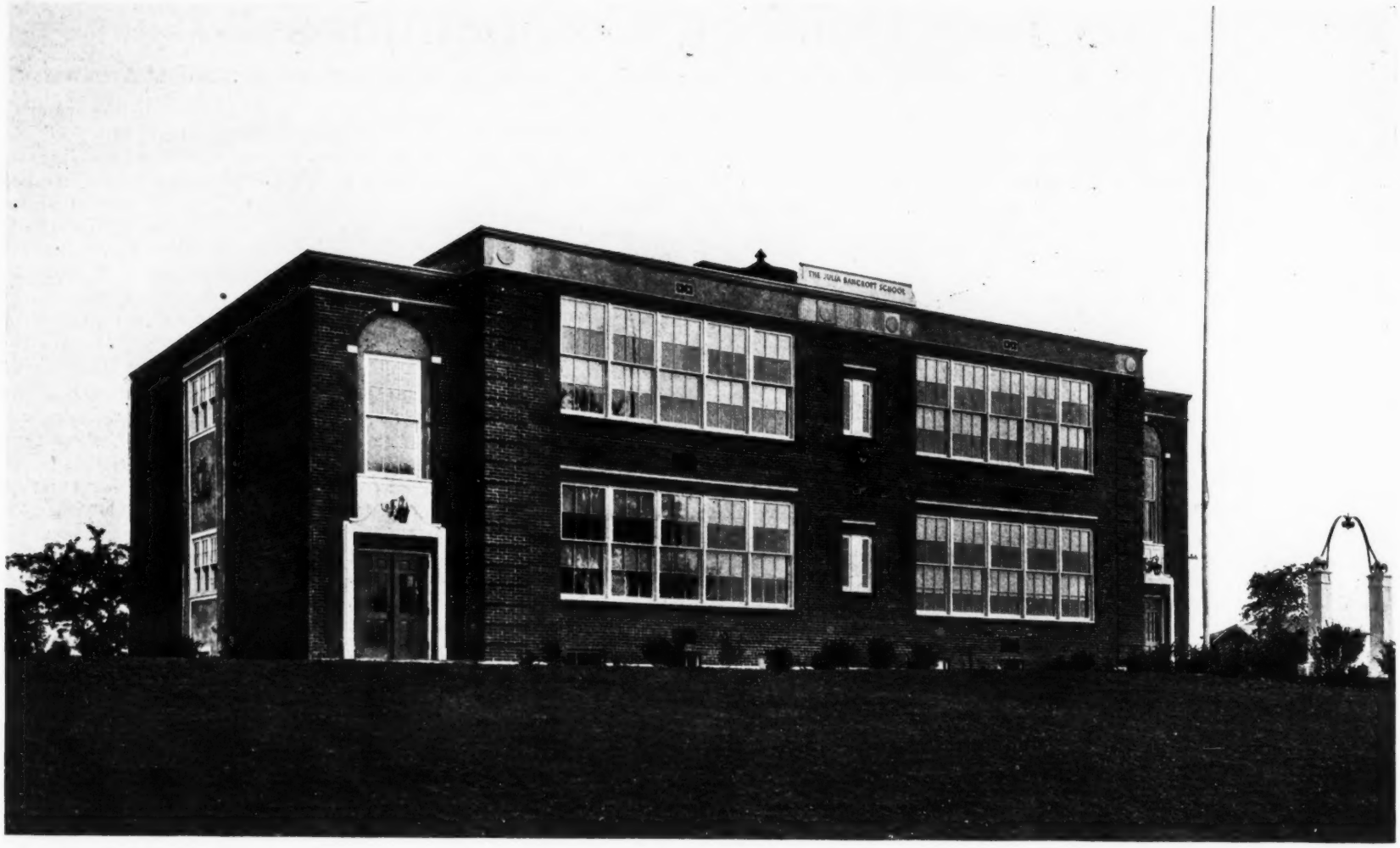
The Contract for Services

It is often argued against the requirements of the American Institute of Architects, that they call for the payment of all competitors. This is utter nonsense, for the institute has never made any such stipulation. It merely calls the attention of owners to the fact that they may make competitions more attractive by paying the competitors or by offering prizes, but that is a matter of business which concerns only the board and the competitors.

The institute does insist that a contract for architectural services be included in the competitive program in accordance with good practice, and this is obviously to the advantage of all parties. It is quite as important for the board to know and to state in advance just what the arrangements are for the payment of the successful architect, as it is for the competitors to know what they are to receive. The inclusion of the contract for services makes for a clear understanding, and clear understandings make fast friends.

In the past, competitions, especially for religious edifices, were held without a stipulation of the amount to be paid the winner for his services, and after the competition had been judged this question was debated between the building committee and the winner. School boards, however, are accustomed to definite statements on this point, and the institute's requirement presents but little difficulty.

The presence of one or more architects serving an advisor and jurors and the provision for



THE JULIA BANCROFT SCHOOL,
AUBURN, MASS.

Morris W. Maloney, Architect,
Springfield, Mass.

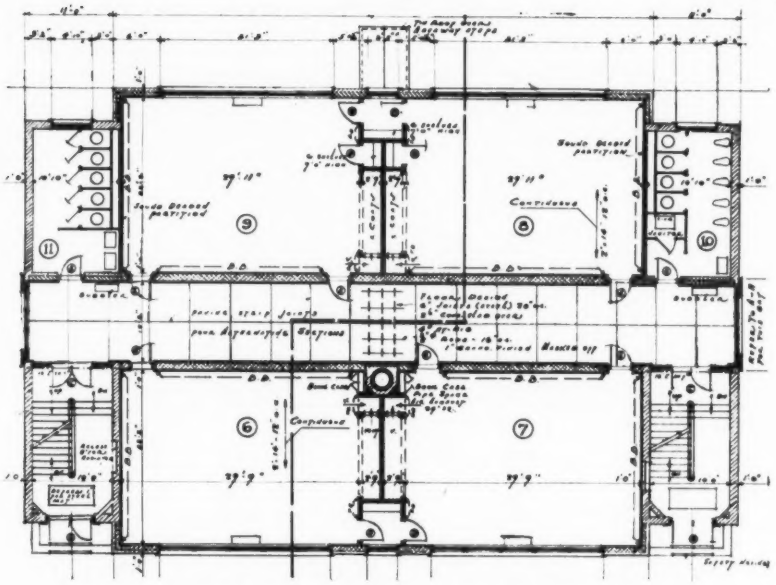
anonymity does give to the competitors the encouragement arising from the assurance that the judgment will be guided by men of technical training. It seems to guarantee too, that it will be less a matter of chance than if laymen were entirely in charge. With that encouragement the competitors will work harder and with greater enthusiasm in their attempt to produce the best possible solution of problem in hand.

When the Board is Final Judge

The point is often raised that the school board must be the final judge and that it cannot legally delegate its powers nor add architects to its membership for the purpose of judging a competition. If this is the case, two or three practical procedures are possible. The board may delegate to a subcommittee composed of certain of its members, with one or more architects added, the duty of judging the drawings and presenting to the whole board the result of its judgment. When this plan is followed, the stipulation should be made that the board will either accept this judgment or, if the jury's decision is rejected, the board will make its own judgment considering all the drawings and always respecting anonymity, a statement of the board's reasons for refusing to accept the judgment of the subcommittee or jury is an essential part of this plan. If possible, it is wise to make available a prize as compensation to the author of the design chosen by the jury, in case he is not appointed architect.

The jury, on the other hand, may be entirely independent of the board. The former arrangement, however, seems preferable, for the reason that the members of the board, who have served on the jury, are in position to explain to the full board the reasons which have determined their choice, and defend the action of the subcommittee or jury if necessary.

It is the belief of the writer that the requirements of the competitions of the American Institute of Architects have been made a sort of bugbear to terrify school boards. As a matter of fact, these requirements, if studied, will prove to be reasonable stipulations which will appeal to the business men who constitute our school boards, as a protection equally valuable to all parties and as an incentive to the competitors to produce the best designs of which they are capable.



FIRST FLOOR, THE JULIA BANCROFT SCHOOL, AUBURN, MASS.
Morris W. Maloney, Architect, Springfield, Mass.
(The second floor plan is identical with first.)

It may be in order to state that the American Institute of Architects, whose membership is represented by the leading practitioners in the various communities throughout the country, has prepared a circular of information on competitions and a standard form of program. This circular is the product of many years of experience and has been changed, simplified, and perfected until, in its present form, it is accepted by practically everyone having in charge an architectural competition. Its terms are easily understood and are recognized as just to both owner and competitor. The standard form of competition program has been prepared for the convenience of committees proposing to hold competitions, and is frequently used by simply filling in the blanks left for the names of the committee, the location of the proposed building, etc. Copies of these documents are obtainable by simply writing to the headquarters of the American Institute of Architects, "The Octagon," 1741 New York Avenue, Washington, D. C., or they may be obtained from the local chapters of the institute, located in the important cities of the country. It is strongly recommended that school boards who have in mind architectural competitions for school buildings obtain copies of this competition circular and program. If after looking over the documents, the members see fit to adopt them, they may rest assured that the good results of the competition will justify their action.

THE ROBERT O. MORRIS SCHOOL, SPRINGFIELD, MASS.

Morris W. Maloney, Architect, Springfield, Mass.

High Quality in Small Schoolhouses

Recent Small Buildings of Morris W. Maloney, Architect, Springfield, Mass.

It is a fact frequently noted by school authorities that, up to a certain point, large school-building projects receive much greater attention in amount and in proportion than do small schoolhouses. In fact, with some notable exceptions, it is difficult to "interest" experienced school architects in the planning and construction of small school buildings, and to secure more than superficial attention, and the writing of routine specifications. And still the small building is socially and educationally quite as deserving of careful architectural service as is the large school. As a public structure it is more important to the small town than is the large school to the city; as an educational and civic center it performs a greater variety of services than the larger structures; and as an investment of public funds it makes greater inroads on tax funds than any other local public work.

Few small school buildings repay the time and effort of a visit and examination or suggest ideas for the betterment of school design and construction. It is gratifying, occasionally to find a group of schools which stand out from the commonplace of conventional work and exhibit genuine study on the part of the architect. Three such noteworthy schoolhouses, the work of Mr. Morris W. Maloney, of Springfield, Mass., are illustrated in these pages. Each building represents a sincere effort to provide the most economical layout for a given educational program, and to combine high-quality materials in the most simplified type of construction. Nor has genuine architectural beauty been overlooked. The controlling principles have been maximum efficiency and permanency with the lowest consistent cost.

The Frederick Harris School

The Frederick Harris School at Springfield, Mass., is in plan and construction the result of a study that sought to provide the smallest cubic capacity and the most economical floor layout, consistent with the educational program, with the highest type of construction permitted by available funds. In other words, the school program was first laid down and consideration was given to the present needs of the children. Ultimate enlargement was taken into account, and these factors were balanced with the most permanent materials purchasable within the available appropriation. Alternate specifications were drawn up for fireproof and for second-class construction, but the bids for fireproof materials proved to be only $5,108 higher so that permanent and safe construction could be adopted. It was felt that the additional cost of 2 cents per cubic foot or $12 per pupil was more than justified.

The building cost as follows:
General construction, $87,445.
Heating and ventilation, $14,128.
Plumbing, $6,914.
Electrical work, $4,451.
Total cost of construction, $112,938.
Cost per cubic foot, $0.387.
Cost per pupil, $257.

Concrete and steel were used for the floors and roof, with gypsum-block cross partitions and all-metal interior doors. The roof is insulated with a two-inch layer of cork, applied over the structural roof deck, over which the 20-year bonded roof was laid. The windows are of the awning type which is ideal for shading, and are provided with weatherstripping, to prevent heat losses and to reduce the operating cost of the heating plant.

The building is heated by a vacuum vapor system and is ventilated by means of unit-ventilators. Full thermostatic control is provided. The heating plant, like the other mechanical equipment, has been designed to permit of expansion to care for an ultimate nineteen-room building.

The sanitation of the building is of the most modern type. All water piping is brass. The toilets are distributed on each floor and are individually ventilated by electrically driven exhaust fans, furnished with the univent equipment. The toilets have floors of white ceramic tile, and the walls are of salt-glazed brick. The toilet partitions are of cork-filled baked-enamel steel, which makes an attractive feature. All stairs and corridors have marble terrazzo floors, with brass dividing strips and salt-glazed brick walls. Special soundproofed membrane ceilings have been introduced in the corridors to prevent reverberations and to absorb noise.

The kindergarten is an independent unit and is quite liberally furnished. There are cork-tile floors, a faience-tile fireplace, separate dressing rooms, and tiled toilet room for the small children. A separate entrance has been provided so that the room may be used easily for community gatherings, for parent-teacher meetings, for mothers' clubs, and the like.

The electrical equipment includes a complete intercommunicating telephone, fire alarm, and program clock and bell system. The fire alarm is connected with the municipal fire-alarm system, and in the event of a fire outside of school hours will directly bring the department. The electric-lighting system was especially designed and has been found quite satisfactory in use. The natural lighting of the rooms has been so arranged that each room has sunlight during some part of the day.

The building has been accepted as a future standard of construction for the city of Springfield.

The Morris School, Springfield, Mass.

The Robert O. Morris School, Springfield, Mass., is two stories high and is built substantially the same as the Harris School, with the exception of the kindergarten. This school is of second-class construction and has been modified somewhat in detail and finish. It has no sound-deadening insulation, nor special equipment for kindergarten purposes.

The cost of construction is as follows:
General construction, $72,767.
Heating and ventilation, $13,990.
Plumbing, $6,994.

THE FREDERICK HARRIS SCHOOL,
SPRINGFIELD, MASS.

Morris W. Maloney, Architect,
Springfield, Mass.

Electrical work, $4,195.
Total cost, $97,946.
Cost per cubic foot, $0.34.
Cost per pupil, $220.60.

The Julia Bancroft School, Auburn, Mass.

The Bancroft School at Auburn, Mass., was erected for a small rural town, a suburb of Worcester. The building is erected on a site formerly used as an orchard and gravel pit, which required considerable grading to put it in suitable condition for the building.

The building is two stories high and is of second-class constructon, with fireproof stairs and corridors. There are eight classrooms, a lunchroom, an indoor playroom, a teachers' restroom, an assembly room, and a heating plant. The assembly room is 22 by 60 ft., and is so arranged that it may be converted later into cooking, sewing, and manual-training rooms, which will increase the number of teaching units to eleven.

The mechanical equipment, including the heating, plumbing, and electrical work, is of a modern type. The building is heated by vapor and the ventilating apparatus is of the univent type.

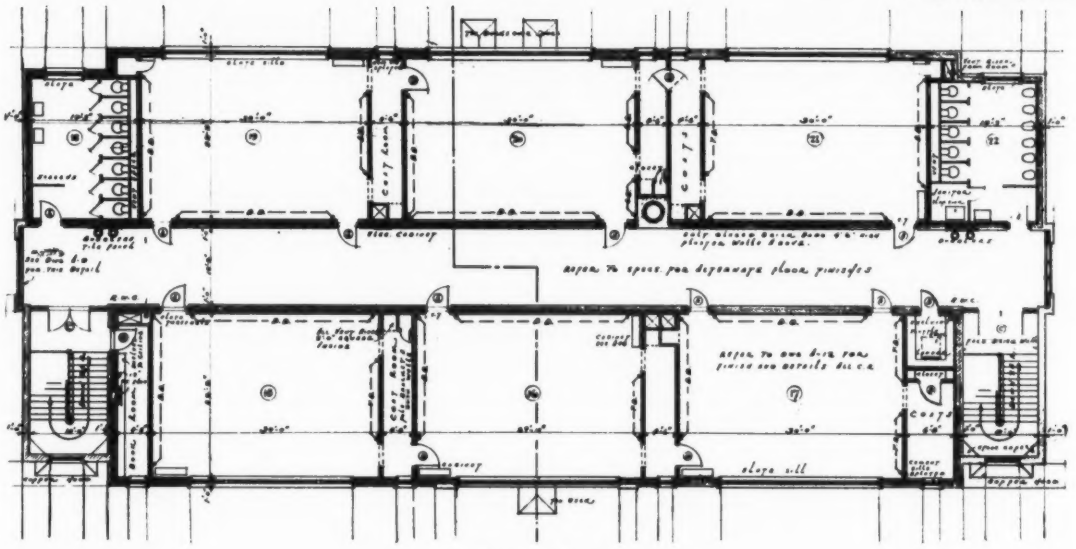
The sanitary system in the building is of the most modern type. The toilets are distributed on the main floors of the building and the piping is all in brass.

The building is of the same standard and quality of construction as the larger buildings illustrated. Modifications in the electrical and heating contracts have permitted a substantial reduction in cost over the larger buildings. Although the cost of the school is less than $65,000, the specifications for material called for standard quality throughout. The use of terrazzo, salt-glazed brick, metal lath, etc., has been adhered to throughout and except for fireproof features is on a par with the larger buildings erected during this period.

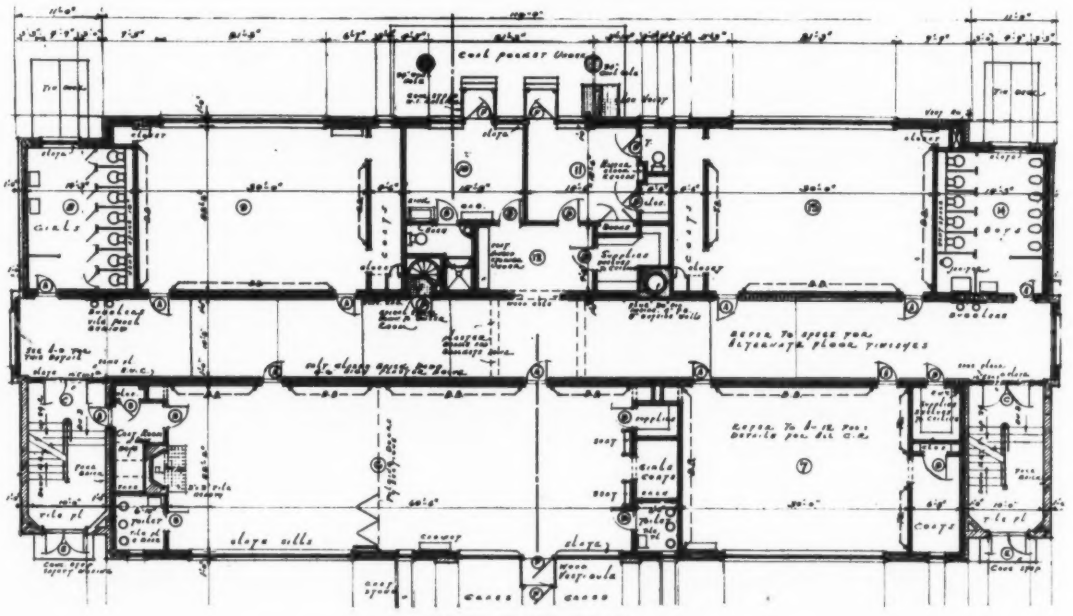
The cost of the building is as follows:

General construction, $48,790.
Heating and ventilation, $9,108.

(Concluded on Page 177)



SECOND FLOOR PLAN.



FIRST FLOOR PLAN.
THE FREDERICK HARRIS SCHOOL, SPRINGFIELD, MASS.
Morris W. Maloney, Architect, Springfield, Mass.

Corridor Ventilation

Samuel A. Challman, Director, Division of School Buildings for Minnesota

The term, corridor ventilation, is of rather recent origin and any discussion of it would naturally call for a definition.

As commonly interpreted by those who approve of it, corridor ventilation of schools means the venting of air from classrooms, coatrooms, libraries, and administration rooms —not laboratories, toilets, nor industrial-education rooms and shops—directly into the corridor through a grille in the partition between the room and the corridor or through a louvered opening in a door leading to the corridor. From the corridor the air escapes from the lower floors up the stairwell, until it reaches an opening in the ceiling in the top story, which opening leads to the base of a ventilator on the roof.

This method of exhausting air eliminates the individual vent duct from each room and also does away with the gathering of these ducts into vent chambers in the attic.

Some Common Misconceptions

In most of the literature on ventilation, these vent ducts are referred to as foul-air ducts. This name has had the effect of producing a rather exaggerated notion of the character of the air discharged from the schoolroom. In view of this, probably the first reaction to corridor ventilation is that the corridors and the stairwells by this means become "air sewers." The mere mention of this term instantly awakens a feeling of repugnance and tends to prejudice the mind of the person to whom the idea is new.

If, however, this method of air disposal is analyzed in an openminded way, it will soon become evident to the thoughtful that the air discharged into the corridor is no worse than the air in the classroom, unless it is contaminated in some way while passing through the corridor. This is scarcely conceivable, even though the corridor be packed at the end of each class period. Furthermore, the air thus discharged is shown by smoke tests to travel mostly along the ceiling of the corridor and vertically up the stairwells. The diffusion of this air which one might look for, really does not appear to occur, judging by the way the smoke hugs the ceiling and travels up the stairwell. A number of smoke tests made by Prof. Frank B. Rowley of the University of Minnesota tend to confirm this view.

In most schools, heated and ventilated by the split system, which is quite generally installed in school buildings, there is no provision for ventilating the corridors. Direct radiation, sufficient to maintain a temperature of 60 degrees is usually installed, and the opening of outside doors and infiltration are generally relied upon to supply enough wholesome air to freshen up the stagnant atmosphere of the corridors and stairwells. Only in rare instances is any provision made for drawing off air through vent ducts, it being generally considered that leakage through walls and ceiling will remove enough air to satisfy the requirements for the use to which the corridors are put.

The Smelly Condition of Corridors

The lack of a constant supply of wholesome air and the absence of any positive means for exhausting air from corridors probably accounts to a large degree for the stuffy and close atmosphere quite often encountered upon entering school buildings on cold wintry days, when doors and windows have been kept carefully closed for some time. While corridors, through which classroom air is discharged, are accused of being smelly by those who are opposed to this method of venting, it must be quite evident that any corridor which has a continuous movement of air toward a positive outlet is at least likely to be less odoriferous than one in which avenues of escape for air have been entirely omitted.

It is also charged that corridor ventilation belongs in a class with "uncontrolled ventilation," and that "it conforms to no particular standard and produces no definite results." In view of what has already been stated with regard to the movement of air in the corridor and in view of what smoke tests have actually shown, the only basis for referring to it as "uncontrolled" is the mere fact that it is not confined within a galvanized-iron duct. Since the outlet in the ceiling is continuously permitting the escape of air, there must of necessity be some results and that these are not indefinite has been demonstrated by the fact that from one half to two thirds of the air forced into the room by mechanical devices is carried off by corridor ventilation. Furthermore, a great many tests, for the purpose of determining the amount of air escaping through individual vent ducts, show no greater amount of air exhausted by this method than by corridor ventilation. The fact seems quite well established, therefore, that no matter what system is used for the exhaust of air from classrooms, one third to one half of the air introduced under pressure escapes in some other way than through the individual vent duct or the grille in the partition. Corridor ventilation, therefore, appears to meet the same standard as the individual vent duct.

Getting Rid of Ducts

All school buildings present certain difficulties when ducts of any kind are to be located. The engineer is forced to accept time and again disadvantageous locations of vent ducts simply because the most desirable places for such ducts interfere with the structural features of the building or encroach upon space needed for other purposes. Then again, when his ingenuity has found a possible way out of the difficulty, the engineer is likely to be confronted with lack of space for full-size ducts, or for ducts of the most efficient dimensions. In consequence, the results are not always wholly satisfactory when individual ducts are installed.

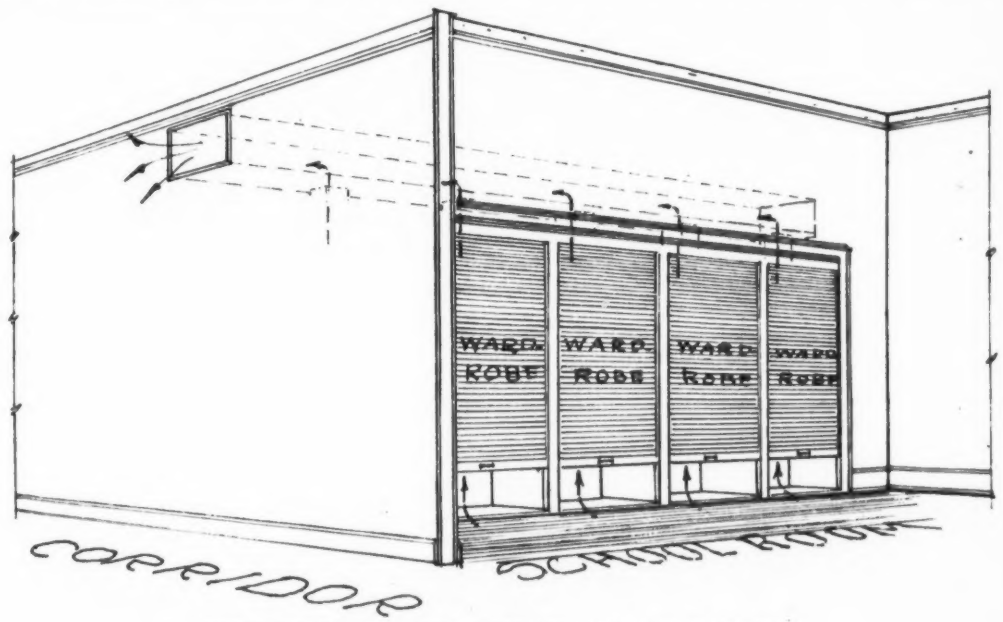
On the other hand, corridor ventilation with vent openings in the ceiling of the top floor presents practically no limitations as to location, since the exhaust ducts merely extend vertically through the attic. The opening can be made any desirable dimensions for the required amount of air to be discharged. From investigations made by engineers, it is quite evident that the area of the grille in the partition as well as the opening of the vent duct in the ceiling must be computed to insure a certain velocity in order to obtain satisfactory results. It has been suggested by some engineers that it is not necessary to provide vent ducts from the ceiling to connect with the ventilators on the roof. While this may be true, it has always been standard practice to make metal vent ducts continuous from the inlet opening to the ventilator on the roof for the purpose of safety in case of fire, for certainty of proper operation, and for the better control of down drafts.

While the individual duct system is quite susceptible to down drafts, particularly when the attic is used as an air collecting chamber and the rooms are not under pressure, the corridor-ventilation system is not likely to have any situation of this kind arise, as the warmer air in the building will establsh an upward current which the colder air from above cannot very well reverse.

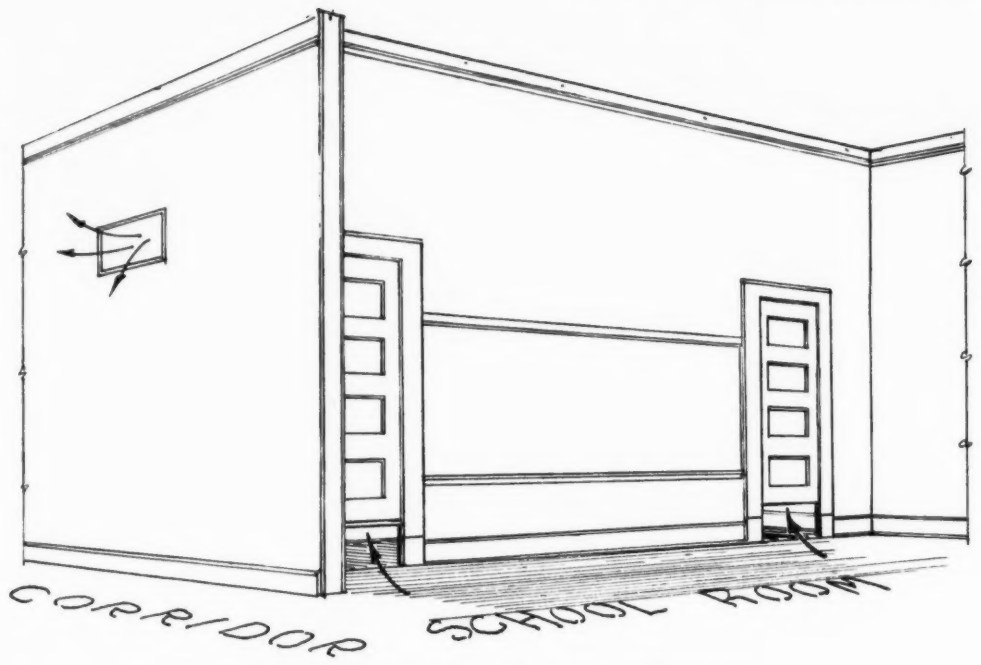
Recirculation Possible

Owing to the fact that the openings in the partition or in the door are without any closing devices, recirculation can very easily be effected in a building with corridor ventilation. This, while not defensible when school is in session, is highly desirable when the building is not occupied, as it reduces the cost of operation.

All ventilation systems are affected more or less by wind pressure. As the openings in doors and partitions in a corridor-ventilation scheme are frequently across from each other, it has been thought by some that whenever wind pressure is rather pronounced, the air might be carried across from one side of the building to the other, due to excess pressure from the windward rooms and a plenum condition of the corridor. This, however, would indicate that the ceiling openings do not afford adequate means for the escape of air—a situation which could readily be remedied by increasing the number of openings in the ceiling of the top floor or enlarging them. Others have gone so far as to assert that when a window on the leeward side is opened, this will cause air from the rooms nearby to exhaust through the open window instead of through the ceiling outlet. To all appearances this is merely a surmise, and, until it can be effectively substantiated, it had better be classified as a ventilation hoax,



CORRIDOR VENTILATION THROUGH BUILT-IN WARDROBE.



CORRIDOR VENTILATION THROUGH CLOAKROOM.

which has been conjured up to meet some embarrassing dilemma.

Noise as a Problem

There are, however, some problems connected with corridor ventilation that cannot be summarily dismissed. In this respect, corridor ventilation is no different from a number of other phases of ventilation. How serious these problems of corridor ventilation are will depend largely upon the viewpoint chosen and the control exercised over the school.

One of these problems is the noise and particularly the singing, which is transmitted through the louvered door, or through the grille between the schoolroom and the corridor, when this grille is located at the floor line. While it is contended that sound will not travel against strong air currents, the fact remains that this criticism of the corridor-ventilation scheme comes from the classroom teacher, and she probably knows better than anyone else how disturbing the noise is. The same criticism does not seem to apply in as annoying degree, however, when the exhaust grille is located near the ceiling, as shown in the illustrations where the air passes through the wardrobe or the coatroom before it enters the corridor. If the louvered door, or the partition grille at the floor level, is preferred, or is necessitated by the interior arrangement of the building, the objection to the noise and singing might be overcome by having music periods and dismissal of classes so timed that they would not interfere with work in the adjoining rooms.

The Fire Hazard

But another much more important consideration is the fire hazard. Owing to the fact that, with corridor ventilation, there is a constant movement of air in the corridor, smoke would travel more rapidly than in a corridor without any pronounced air movement. If, on the other hand, the stairs would be closed off from the corridors by fireproof doors, as is done in some states, the smoke would accumulate in the corridor, unless the corridor were equipped with a large vent flue of sufficient capacity to carry off the air discharged from the various rooms. If such a vent flue were built, it would of necessity be the equivalent of a certain number of individual room flues and would really have nothing in its favor, except that the corridor would be heated and ventilated by the air discharged from the classrooms on its way to this vent flue.

Both of the situations described exist in a number of buildings. Those who have the open stairwell with the ceiling opening, point to the fact that the movement of smoke tends to become densest at the ceiling, and, therefore, corridor ventilation is an advantage in facilitating the escape of persons from the building. In its vertical rise up the stairwells, it follows the air currents moving toward the ceiling outlet, and in its initial movement does not tend to diffuse to any great extent. Those who have the inclosed stairway and the large vent duct in the corridor stress the fact that smoke would naturally be confined to a comparatively small part of the building, and the stairways would be free from any accumulation of smoke which would endanger the lives of the occupants.

An Insurance Man's View

An insurance official of the General Inspection Bureau for three northwestern states, after having observed several smoke tests made for the purpose of arriving at some conclusion as to the fire hazard, has made a written report in which he comments upon the danger of the corridors filling with smoke and interfering with the escape from the building. With reference to corridor ventilation, he has this to say: "In this case it seems that the situation was taken care of by the corridor-ventilation system, and in this connection it would seem that the vital point would be to have a sufficient number of stairways and vents of adequate size so that any accumulation of smoke can easily be disposed of."

From a safety-to-life standpoint, it is quite evident that insurance authorities are leaning strongly toward provisions made for the escape of smoke from buildings. In the case of the stage loft of theaters, for instance, the ordinances of most cities, as well as the building code recommended by the National Board of Fire Underwriters, provide that any devices installed in the loft shall be arranged "to open very surely upon fusing of a link," thereby affording "a quick release of smoke and hot explosive gases."

While some years ago engineers as a rule did not take kindly to the suggestion of substituting corridor ventilation for individual room ducts, it is fairly safe to assert that today a large number are favorably disposed, a smaller number tolerate the device, while a few oppose it very strongly, principally on the ground of the fire hazard.

The Cost Element

No reference has been made to the cost of the corridor-ventilation system in comparison with the individual-room-duct system. While no doubt, some economy may be effected by adopting the corridor-ventilation system with the open stairwell and the ceiling outlet, there would not likely be any economy, whatsoever, where the corridor vent duct would be substituted for the individual room vent. Besides a large duct in a corridor would likely prove a troublesome architectural feature for which no corresponding advantage could well be claimed. In any event, economy is not an argument unless satisfactory service can be shown.

Factors Determining the Size of a High-School Building

James M. Turner, Saint Paris, Ohio

This is one of the important problems confronting boards of education, school executives, architects, teachers, and patrons in every large city in the country. No definite standards have been set up in regard to the size of high-school buildings because no reliable data have been collected that would solve the problem. Many cities are saying that no high school shall be erected to accommodate more than 1000 pupils. Other cities place the maximum at 1500, and a few place the maximum at 5000 and even higher.

A solution to all school problems is usually arrived at, first, by opinions and if the problem is important enough, facts are obtained by careful research and investigation for a final solution. A solution to the problem of the size of high schools has only reached the first step. It is, however, important enough for some individual or organization to obtain reliable data on which cities could depend.

The purpose of this paper is to review the opinions of educators who have given some attention to the factors determining the size of high schools.

Some Survey Findings

In the Baltimore school survey of 1920-21 it was recommended that the 8500 to 9000 junior-high-school pupils to be provided for, be housed in five or six buildings. The Baltimore survey further states that it is disadvantageous and uneconomical to build school buildings housing less than 1000 children; the tendency should be to plan buildings which ultimately will house 1500 to 2000 children.

The Providence, Rhode Island, survey of 1923-24 says that school buildings should be planned which will ultimately care for a minimum of 1400 pupils. In the junior high school 1500 is a desirable minimum. For senior high schools 2500 may be considered the ultimate minimum.

The Atlanta, Georgia, school survey states that each of the proposed high schools should be planned so as to adequately provide for 2500 to 3000 students. When such capacities are reached, it will be necessary to erect other high schools or to plan a new development of high schools which the experience of the five or ten years in these new institutions will point out as desirable.

Mr. W. F. Webster, superintendent of schools at Minneapolis, Minnesota, in his annual report of 1924, recommends the following standard minimum capacities: For junior high schools 1000 is desirable and 1200 the maximum; for senior high schools 1500 pupils is desirable and 1800 the maximum.

Mr. C. P. Botsford, superintendent of schools at Hartford, Connecticut, answers a letter of inquiry as follows: "The city of Hartford has in the past gone on the principle that large school units of all grades were the most satisfactory. Thus we have developed a senior-high-school unit which at one time housed 3000

pupils. Every one has, I think, now come to the conclusion that this unit is entirely too large, and the school population in this unit is now reduced to 2000, which many think is still too large. Two new high-school units which have been built within the past ten years, have been designed to accommodate not over 1200 pupils with the ideal maximum as 1000."

Mr. Botsford gives the following points as factors determining his decisions: The maximum number of teachers which a principal could properly supervise, pupil mileage, traffic congestion in connection with the assembling or dispersing of especially large groups of young people.

Curriculum and Local Factors

Mr. L. W. Conner, chief of the Bureau of Educational Research of Cleveland, Ohio, writes as follows: "We consider a great many factors here in determining the size of a high school. In our judgment the most important single factor is the curriculum to be administered. The second is the number of children needing education of the kind to be given in the school who live within reach of it. This of course, involves the study of transportation facilities."

Mr. Conner further says that he is inclined to think that every city must determine its own principles. "For example, I know cities where high-school attendance has been more than doubled by the building of an additional high school, when, from the consideration deemed most important in the two principles set up above, one better located central high school would have done the job much better."

Mr. C. Edward Jones, suprintendent of schools at Albany, New York, has the following to say: "I do not believe that morality and health are particular factors in determining the size of a high school. The principal factor is ability to administer. Our own high school was built to accommodate 1400 pupils. I believe that that is about the correct size, although we have been obliged to accommodate about 2000 at one time in this building. Larger cities must accommodate more. It would seem to me that ideal conditions, regardless of expense, would be reached with approximately 1200 children."

Mr. Frank P. Morse, supervisor of secondary education at Boston, Massachusetts, answers the letter of inquiry as follows: "I do not know that anyone has ever scientifically determined the proper limit for the size of high schools. I can easily see very great difficulties in making such a determination; there are so many factors involved in the matter. I am of the opinion that 1500 pupils is enough for a high school. I am obliged to admit, however, that I know of some excellent high schools of 2500-3000 pupils. I think that the distance of pupils from the school, transportation facilities, and the school spirit, have some bearing in the case. I do not see under proper administration why the morality or discipline or retardation of pupils need enter into the question. There is very great advantage in a school of such size that its auditorium will accommodate at one time at least half of the school. It is desirable in my judgment, to have an auditorium of such size that all of the school can be accommodated if possible. The building of auditoriums to accommodate more than 1500 pupils means considerable expense in the construction, and it means necessarily a great deal of waste space in the building during a considerable part of the school year. It is also difficult to make satisfactory use of an auditorium of more than 1500-pupil capacity. This is one of the reasons why I think 1500 is a reasonable limit for the size of a high school.

"It does not seem to me that the relation of the principal to the individual is a factor which enters seriously into the question of the size of high schools. Except through the assemblies, the principal is pretty much out of contact with the average pupil in a high school with 1500 pupils. At least the difference in his contact with an individual pupil of a high school of 1500 or one of 3000 is not in my judgment of great consequence."

The Findings of Architects

The American Institute of Architects, Washington, D. C., in their published report of April 16, 1927, have the following to say in regard to the size of a school building: "Your committee is not satisfied that the erection of school buildings of a very great size serves the best interests of education.

"In every new project the number of pupils that should be seated in a typical classroom is always a subject of debate. Although it is primarily a scholastic subject, the plan is nevertheless profoundly influenced by its disposition. But, however important the size of the classroom unit may be, it is evident that the size of the school itself involves much more serious pedagogical and architectural questions, and it is curious to note that the more comprehensive viewpoint receives but scant attention."

The size of the school concerns the architect. For if he is indifferent to the real objective of his client, he cannot expect to accomplish any worthwhile result.

"The tendency of the age in business enterprise is toward large concentrations of capital, men, and machinery. The motive is to increase profits by lowering the cost of production.

"It is only natural for a board of education, composed in the main of business men, to pursue the trend of thought generally accepted as sound in their community and to draw a parallel between the successful conduct of a pecuniary enterprise and the business administration of a school.

"It is on the way of becoming common practice to herd 300 to 5000 pupils under one roof, and there are projects in the making of even greater magnitude.

"The claim is made that mass education lowers per-capita expense. Teachers, however, are not cost accountants; they are only interested in their profession. They protest that the modern drift toward jumbomania tends to nullify their efforts. The situation is not without humor. In the larger schools at least it is clear that as its business organization approaches perfection there is a noticeable slump in the quality of the product. Surely there must be something wrong with such a system.

"1. Does not the answer lie in the statement that efficiency in the use of money and efficiency in education are separate ideals and that in many cases no effort has been made to reconcile them?

"2. It may be that when the huge school fails to achieve its purpose it is not chiefly due to its size, but because its proponents are more interested in the reduction of operating charges than in learning.

"3. Difficulties in teaching and administration are so magnified by expansion that they become, at times, not merely greater handicaps but, in effect, new problems.

"4. Your committee notes the dismay of the principals and the faculties, overwhelmed by the constantly increasing number of their pupils. Many leaders among the teaching profession are of the opinion that the size of a senior or a junior high school should not exceed 1500 pupils. Some authorities say that if results only are to be considered, the maximum should not pass 1000.

"5. Without violating these ideals it is conceivable that many thousand pupils can successfully pursue their studies under one roof, but only when the main approach to the problem is from the cultural and not from the financial viewpoint.

"6. If there is a solution it must be sought in a new plan and not in the mere inflation of a scheme which may have served well enough other times and customs.

"7. Your committee does not feel that it is in possession of sufficient data to enable it to express an authoritative opinion on a matter which impinges on such diverse human interests. The city plan, the distribution of population, the fraction inherent in transportation, all ponderable factors, are not even alluded to.

"At this time it presents a situation to the Institute and urges its successor to continue

(Continued on Page 172)

AUDITORIUM, TAYLOR ROAD SCHOOL, CLEVELAND HEIGHTS, O.
Franz C. Warner, Architect, Cleveland, O. (See Page 80.)

Wm. B. Ittner's Suburban Schools Around St. Louis

The Clothes They Wear

Emily Grant Hutchings, St. Louis, Mo.

Cities, like people, are judged more or less accurately by the clothes they wear. Just or unjust, this verdict is inevitable and must be taken into account. In no particular is it more swift or irrevocable than in that of the public schools. The exterior of a school building portrays more accurately than is generally conceded, the community which that building serves. If the community is of low grade, deficient in energy and lacking in pride, the school will be stupidly utilitarian, in the mistaken attempt to serve the ends of economy.

When the objectives of public education changed, the schoolhouse changed within and without. The old-time sordid packing-box type of school is a relic of that period when children went to school to have learning pounded into them. Now when the school is thought of as a Child World where consideration is given to the diversified natural interests and talents of children, and the learning process reversed, so that the child actually learns by doing, the beauty. The gymnasiums and auditoriums with school building has taken on new life, diversity. their accessories, the workshops, libraries, and laboratories, gardens, and playgrounds have all made a contribution to the clothes our present-day schools are wearing. Safety, proper lighting, and good ventilation have become further contributors. Permanent building materials, the outcome of demands for safety and durability, and the "open plan" initiated and developed by Wm. B. Ittner in St. Louis about a quarter century ago have made of the school not alone an architectural and engineering problem, which only specialized skill and experience can cope with, but a problem saturated with unlimited possibilities for beauty in the varying proportions of line and mass and color. In the hands of the competent, these possibilities have fared well and have followed the basic law of the world's greatest artists—that the essence of beauty is simplicity.

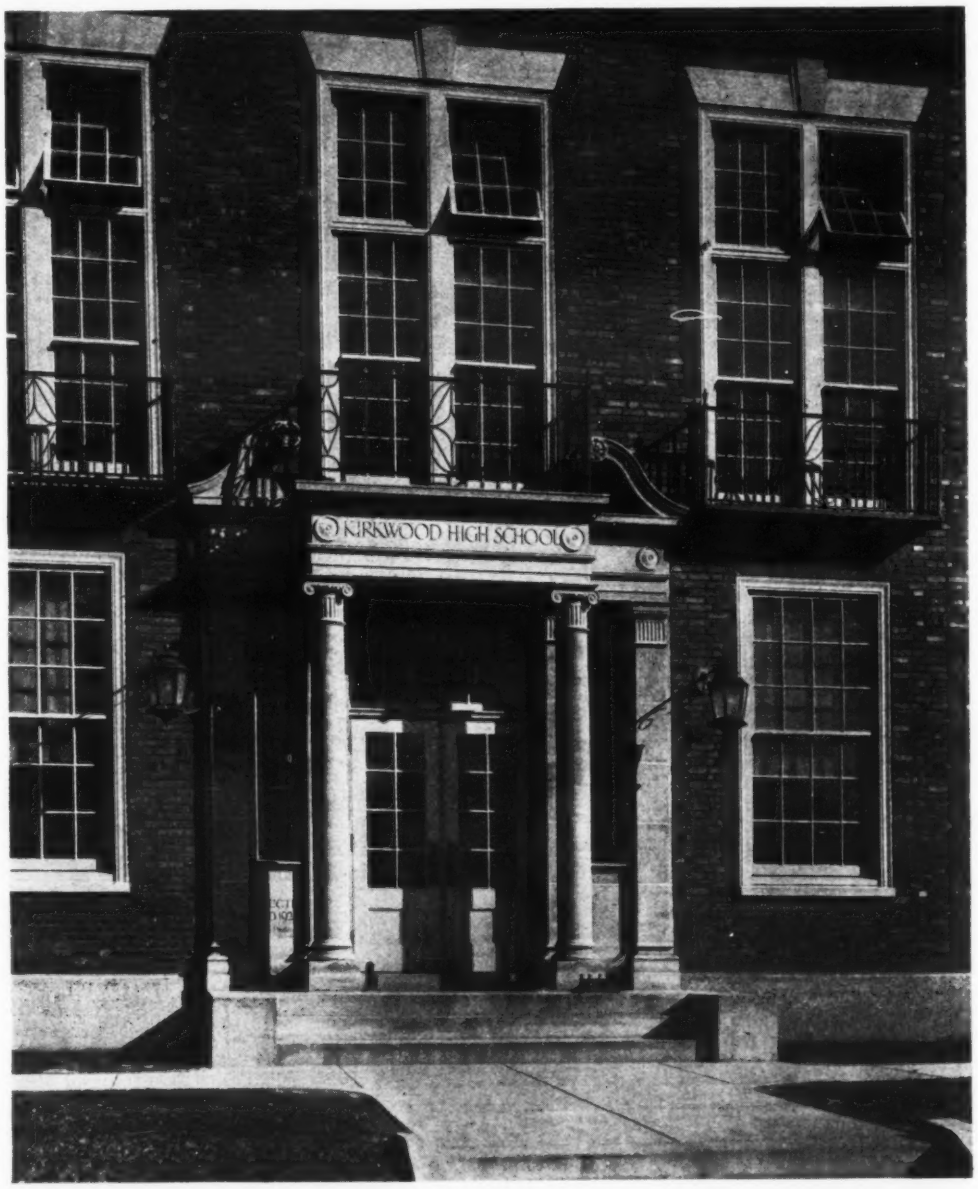
The principles mentioned above are admirably embodied in a group of suburban buildings, in the small towns surrounding St. Louis, in Missouri and Illinois. Such structures as the Harris Teachers' College, Soldan, Yeatman, and McKinley high schools, and Wyman, Clark and Bryan Mullanphy elementary schools, for which St. Louis has long been famous, are outside our present concern. They are city schools, in a municipality that has grown up with the Ittner idea in school planning and construction. Yet it cannot be denied that they have had their effect on the suburban towns tributary to St. Louis. The elementary and high schools of Kirkwood, Webster Groves, Clayton, on the Missouri side, and Granite City in Illinois, will serve to illustrate a variety of points in meritorious architectural design and good taste. In each instance, economy was an important consideration in both plan and material. In fact, Mr. Ittner continually emphasizes the dependence of successful design on efficient building plan. Without exception, these suburban schools embody the idea that a schoolhouse is a place where boys and girls may live a natural, balanced life amid daily surroundings that unconsciously perhaps, but surely affect character.

In each of the suburban school buildings the exterior walls are of common brick, but brick so carefully selected and so skillfully variegated that after they have undergone the toning process of light and weather, they take on the aspect of a rare old Turkish carpet. This skillful handling of brick is one of the distinguishing marks of Wm. B. Ittner's schools.

Kirkwood, Mo., has the character of the suburban towns around Boston. The colonial building, with its dignified lines and its chaste simplicity, is essentially symbolic of the town. It stands near the middle of a six-acre tract of land, with athletic field and school garden adjacent. The rear façade is quite as attractive as the front, with its low boiler house, its end square smoke stack, flanked by gables with wide, walls broken in pleasing proportion and its tall flat chimneys. Inasmuch as the pupils see this façade more constantly, during recreation and athletic periods, than they see the front of their school, the importance of a beautiful rear e'evation is apparent. Here, beauty costs absolutely nothing. Its charm lies entirely in color and proportion, and a shabby back wall would have entailed the same expense.

One of the outstanding suburban elementary schools is the new DeMun School in Clayton. Here the building is adapted to the slope of a hill, the topography being made to serve not only the present need but the future accretion of classrooms and auditorium, as that section of Clayton grows in pupil population. The elongated front of this structure, with its hammer-squared stone base and its creosoted half-timber effect, its bay windows and patterned brick wall, is like an exquisitely wrought mosaic. Most of his affection the architect lavished on the kindergarten, which occupies the center-front of the ground floor. At one end of this superbly lighted room is a small stage, with concealed passageway to the corridor. The DeMun School is a superb example of the open plan, which, as previously stated, originated in the St. Louis schools, when Mr. Ittner was architect for the board of education. It was his first notable achievement, when he was confronted with the necessity of getting away from the hazardous old dumb-bell type of building.

The Granite City, Ill., high school serves a community that has grown up around the enormous steel industry of the town. The present building is the first unit in a plan that will ultimately make this one of the most important community high schools in America. In its general plan, it follows the lines of the Kirkwood high school, although the colonial features are not so marked. Whereas the vocational training in Kirkwood is limited to woodworking for boys, and cooking and sewing for girls, the Granite City school radiates from the vocational center. There are spacious and well-lighted shops, drafting rooms, superbly equipped laboratories, in which the boys are required to solve practical problems with materials brought in from the various industrial plants of Granite City. One of the exceptional features of this school is its auditorium, with seating capacity for a thousand, while the stage will accommodate another five hundred. A collapsible partition, sufficiently soundproof to permit the stage and the auditorium to be used simultaneously, was devised for the peculiar needs of this institution. The auditorium is provided

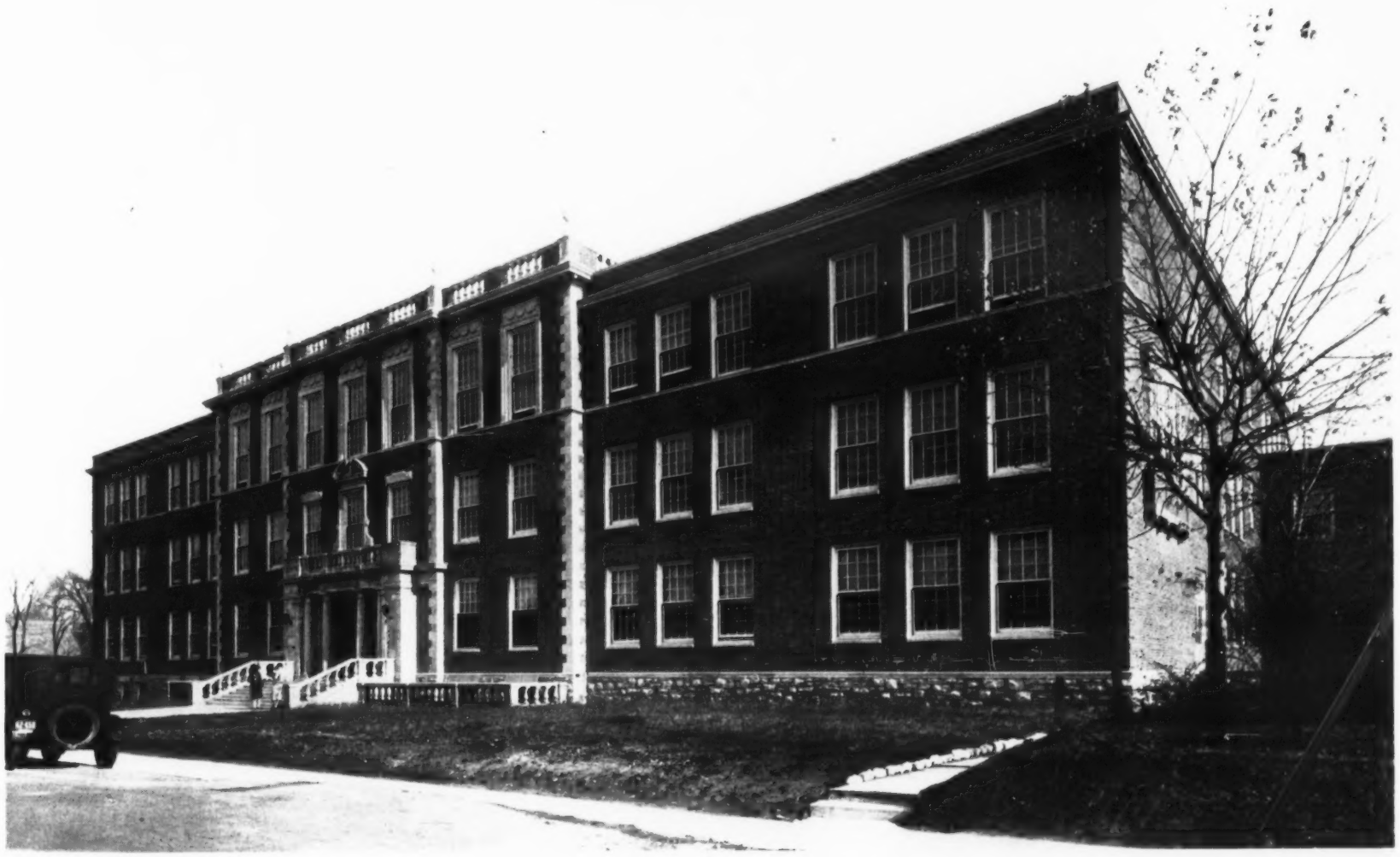


DETAIL OF ENTRANCE,
HIGH SCHOOL, KIRKWOOD, MO.
Wm. B. Ittner, Architect, St. Louis, Mo.

That the "essence of beauty is simplicity" is the basic law followed by the world's great artists. In the hands of a master-designer, the simplest materials give the most satisfactory results.

COMMUNITY HIGH SCHOOL, GRANITE CITY, ILL.
Wm. B. Ittner, Architect, St. Louis, Mo.

The site of the building was a corn field before the structure was completed, but now is the attractive center of a high-class residence district. The building derives its charm and dignity quite as much from its simple lines and good proportions, as from carefully chosen brick and roofing materials.



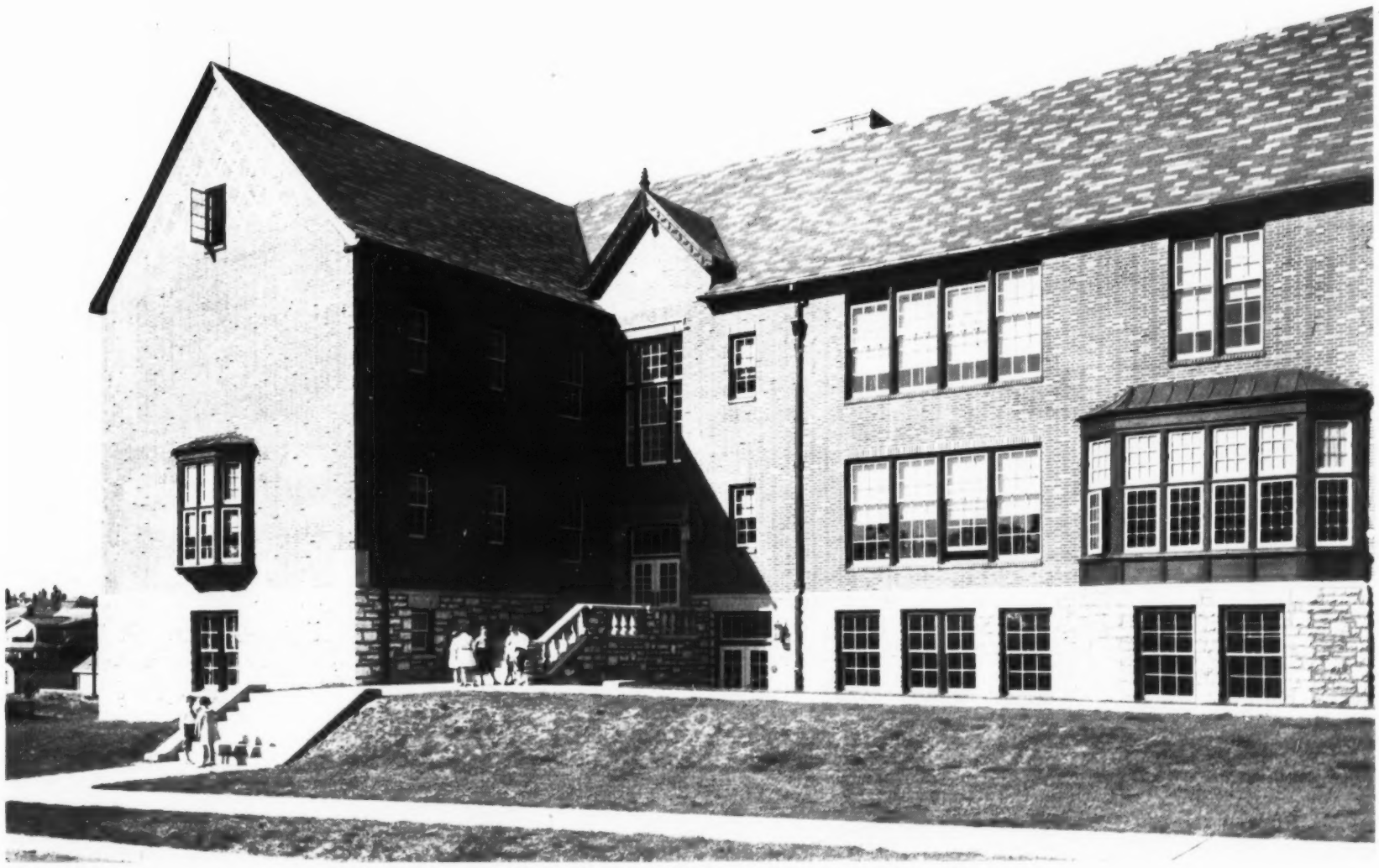
HIGH SCHOOL, WEBSTER GROVES, MO.
Wm. B. Ittner, Architect, St. Louis, Mo.

The newly completed high school in Webster Groves occupies the ground adjacent to the old high school and is connected with it, so that the facilities of the new building are readily available for the old. The judicious planting of trees and shrubbery at the junction point of the two buildings serves temporarily as a screen to conceal the architectural dissimilarity of the two sections. Eventually the old building will be replaced by a connected annex to this new school.

with moistened, heated or cooled air, and the air inlets in the ceiling constitute a novel and most effective part of the decorative scheme.

The twenty-six-acre tract on which the Granite City school is located was a corn field on the outskirts of Granite City six years ago. It has been transformed into a model of landscape gardening. The building is set at an interesting angle with the sides of the campus,

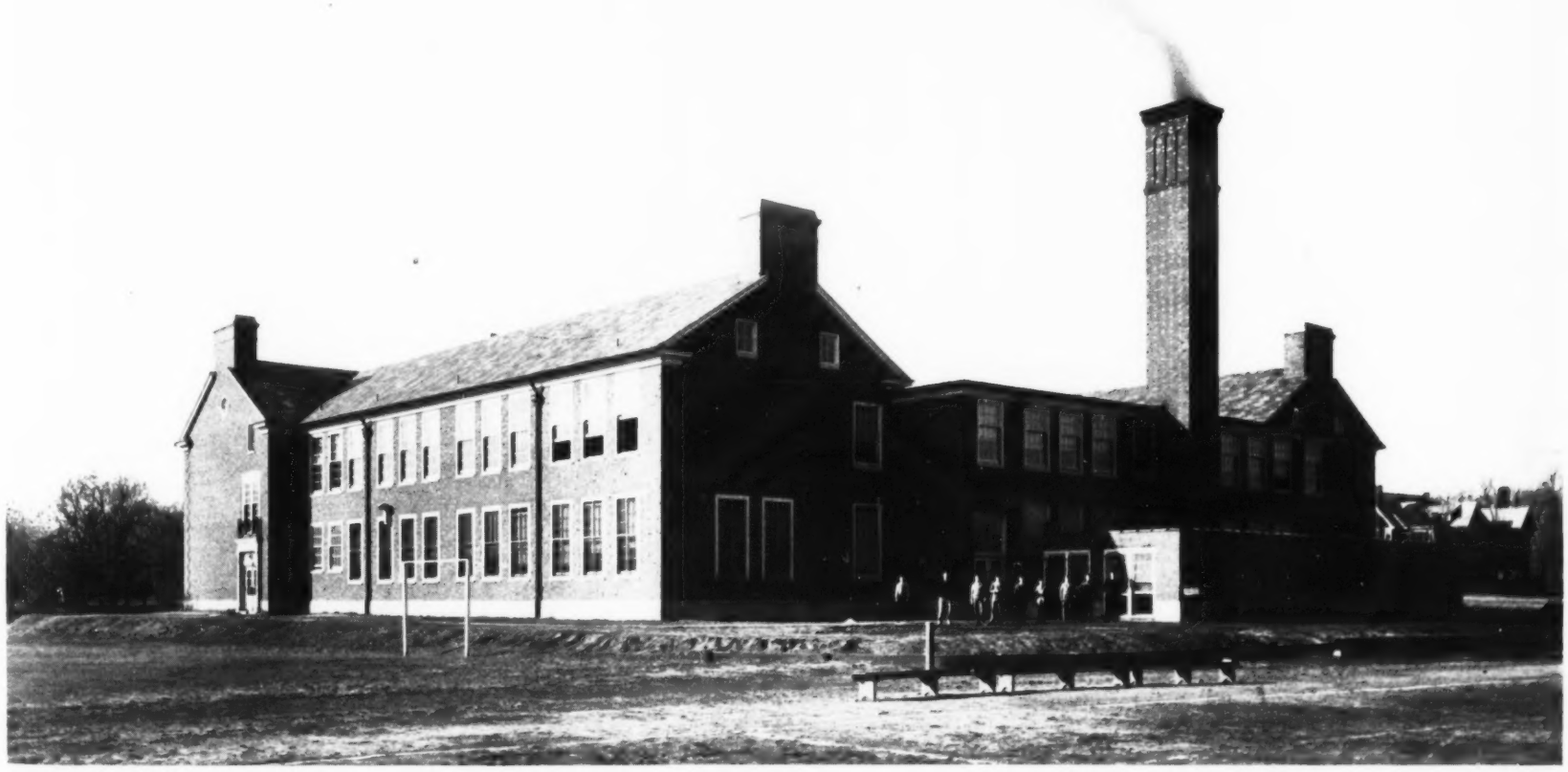
BRISTOL ELEMENTARY SCHOOL, WEBSTER GROVES, MO.
Wm. B. Ittner, Architect, St. Louis, Mo.
The diaper pattern of the gables is so inconspicuous that it charms without arresting attention.



DETAIL,
DE MUN ELEMENTARY SCHOOL, CLAYTON, MO.
Wm. B. Ittner, Architect, St. Louis, Mo.
The DeMun School is adapted to the slope of a hill. The elongated front of this structure, with its hammer-squared stone base and its creosoted half-timber effect, its bay windows, and irregularly patterned wall, is like an exquisitely wrought mosaic.

HIGH SCHOOL, KIRKWOOD, MO.
Wm. B. Ittner, Architect, St. Louis, Mo.

This colonial building, with its dignified lines and its chaste simplicity, is essentially symbolic of the town which has the character of the suburban towns around Boston.



REAR VIEW.
KIRKWOOD HIGH SCHOOL, KIRKWOOD, MO.
Wm. B. Ittner, Architect, St. Louis, Mo.

The rear facade is quite as attractive architecturally as the front, with its low boiler house, its end walls broken in pleasing proportion, and its tall, square smoke stack flanked by gables with wide, flat chimneys. Here, beauty costs absolutely nothing. Its charm lies in its color and proportion, and a shabby back wall would have entailed the same expense.

commanding a view of two important public highways, and the additional buildings, to be erected, will present four impressive façades to the motorist crossing the state from the north or east. One effect of this school, impressive to the taxpayer who must bear the ultimate cost, is that it has developed a high-class residential section, with constantly advancing real estate values, where a few years ago only squatters' shacks were to be found. This is the least important, but the most obvious of such a school. It sets a standard of excellence toward which the community cannot choose but grow.

The chief school executives of the suburban schools selected as illustrations are as follows:

Webster Groves, Missouri—W. A. Gore, superintendent of schools.

Clayton, Missouri—John L. Bracken, superintendent of schools.

Kirkwood, Missouri—E. P. Tillman, superintendent of schools.

Granite City, Illinois—W. F. Coolidge, superintendent of schools.

AUDITORIUM OF THE COLUMBIA HIGH SCHOOL, SOUTH ORANGE AND MAPLEWOOD, N. J.

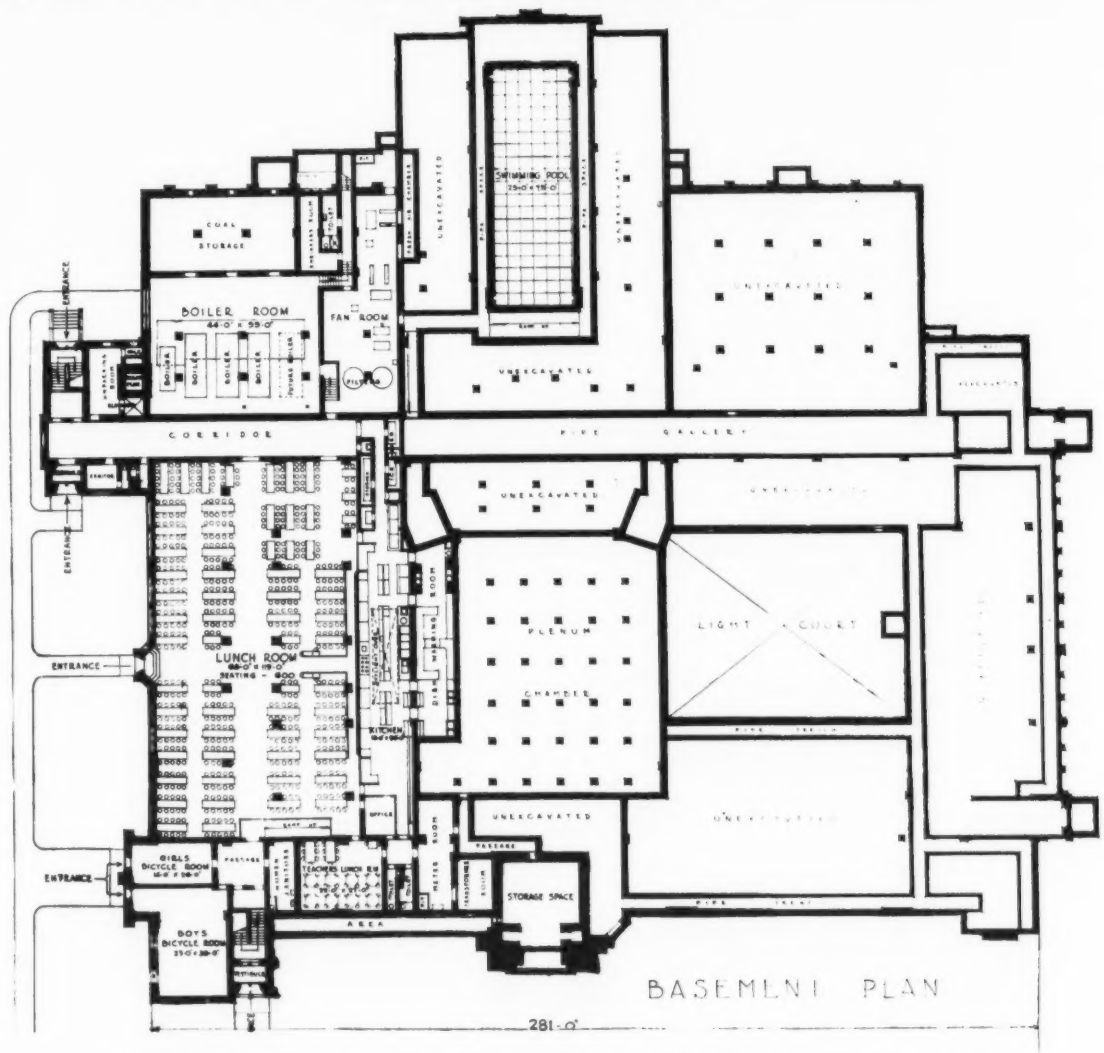
COLUMBIA HIGH SCHOOL, SOUTH ORANGE AND MAPLEWOOD, N. J.

Designed by Messrs. Guilbert & Betelle, Architects, Newark, N. J.

It may be recalled that in the special Building Number of the JOURNAL for January, 1926, several of the new grade schools in South Orange and Maplewood were illustrated in connection with an article describing the community and the local point-of-view and objective in the school-building program. With the grade school situation taken care of temporarily, attention has been given to a senior-high-school building, which is located in the geographical and population center of the two communities. This school, known as the Columbia high school, is now completed and occupied, and is illustrated in this issue.

As indicated in the plans, this building contains practically every desirable feature that should be included in a fine modern high school. The standard classrooms are supplemented by rooms for special subjects. The shops and other special rooms are liberal in size for their purpose, and it has been found that, as a rule, these special rooms are crowded when all the furniture has been installed. The auditorium, in the center of the building, seats 1300 persons, and incorporated in the large stage is a handsome pipe organ.

The boys and girls have been treated equally so far as gymnasium accommodations are concerned, each having a full-size gymnasium, with permanent concrete bleachers across one side. Between the two gymnasiums has been located a tile-lined swimming pool, with a spectators' gallery above and around it. The tank proper is 25 feet wide and 75 feet long. Between the swimming pool and the gymnasiums are the boys' and girls' locker rooms, so they serve both



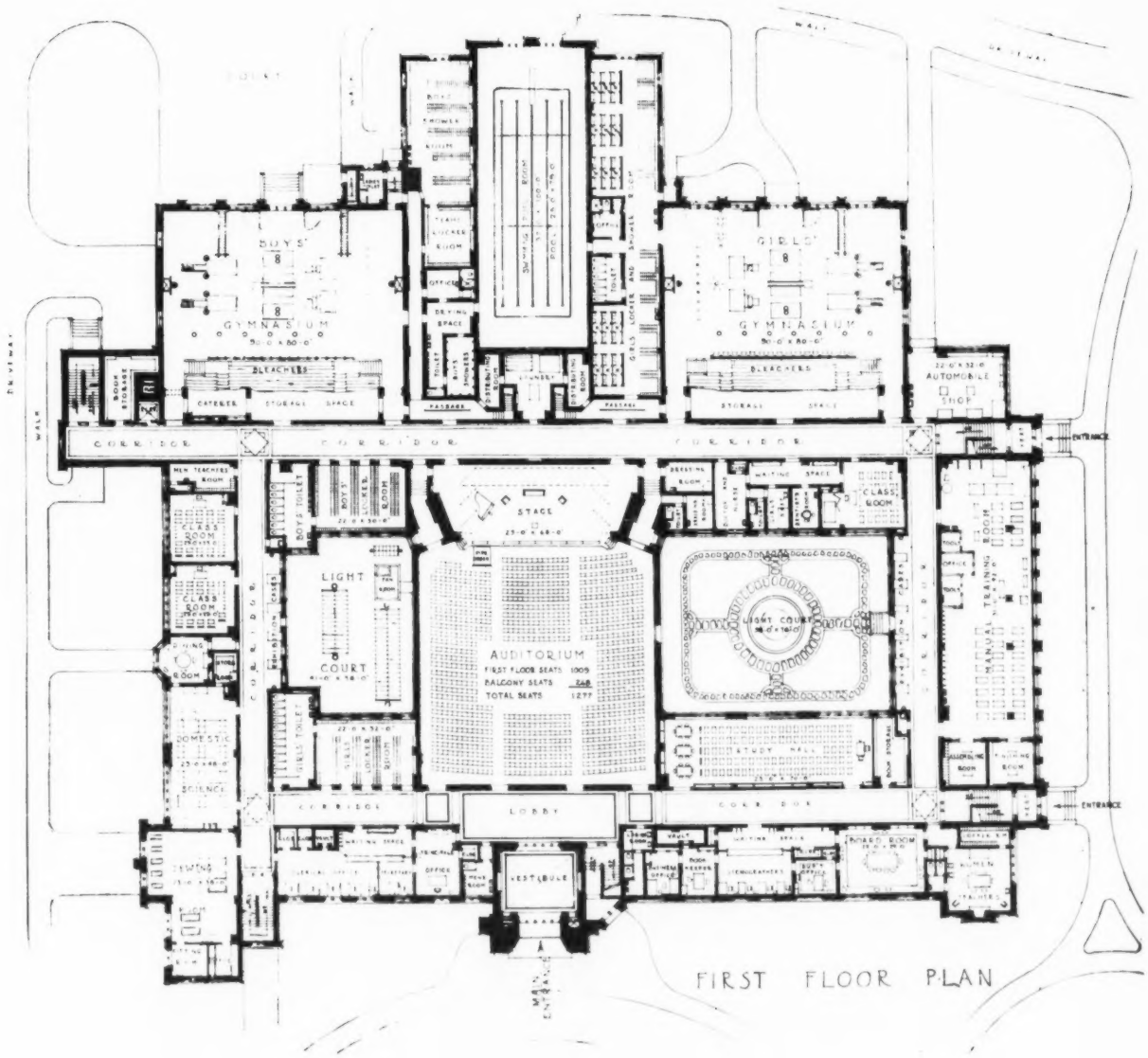
COLUMBIA HIGH SCHOOL, SCHOOL DISTRICT OF SOUTH ORANGE AND MAPLEWOOD, N. J.
Guilbert & Betelle, Architects, Newark, N. J.

COLUMBIA HIGH SCHOOL, SCHOOL DISTRICT OF SOUTH ORANGE AND MAPLEWOOD, N. J.
Guilbert & Betelle, Architects, Newark, N. J.

FIRST FLOOR PLAN,

COLUMBIA HIGH SCHOOL, SOUTH ORANGE AND MAPLEWOOD, N. J.

Guilbert & Betelle, Architects, Newark, N. J.



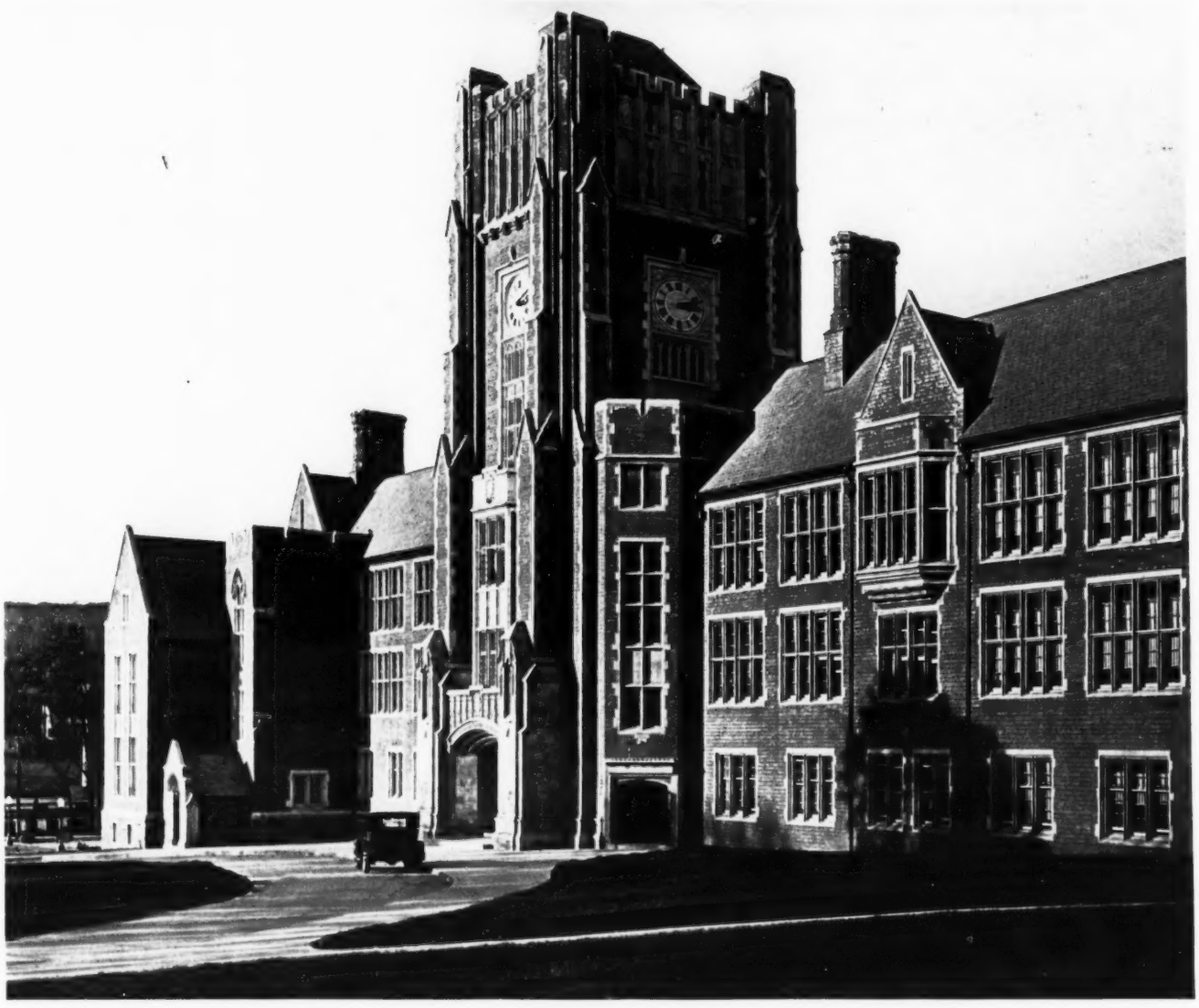
MAIN ENTRANCE DOORWAY.

TOWER.

MECHANICAL DRAWING ROOM.

COLUMBIA HIGH SCHOOL, SCHOOL DISTRICT OF SOUTH ORANGE AND MAPLEWOOD, N. J.

Guilbert & Betelle, Architects, Newark, N. J.



TOWER AND FACADE.
COLUMBIA HIGH SCHOOL, SCHOOL DISTRICT OF SOUTH ORANGE AND MAPLEWOOD, N. J.
Guilbert & Betelle, Architects, Newark, N. J.

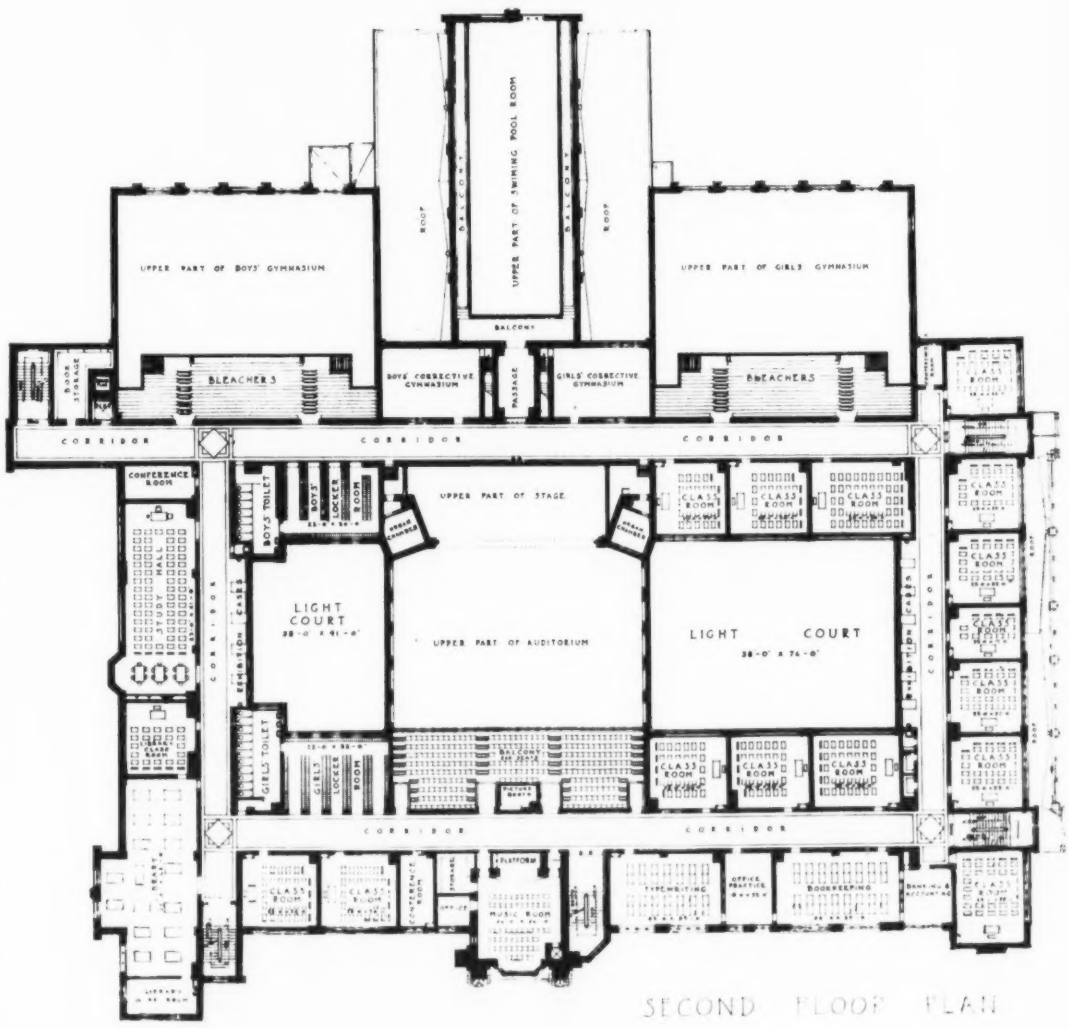
the gymnasiums and swimming pool at the same time.

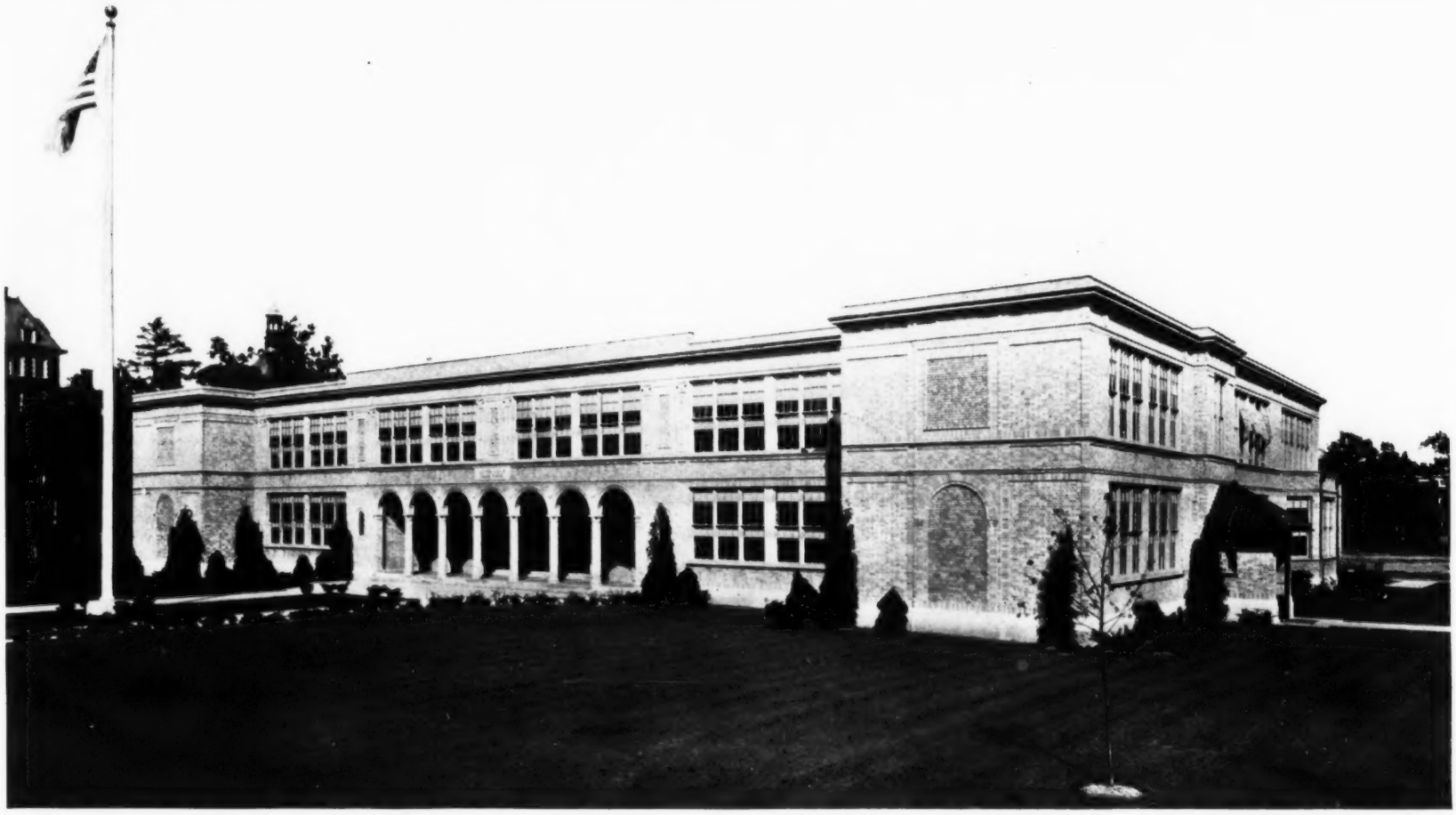
The materials used throughout the building have been selected with care, and with a view of being substantial yet simple, and suitable for the hard usage to which a school building is subjected. The exterior of the building is in the Gothic collegiate style, of red brick with limestone trim and a variegated slate roof. The building is fireproof throughout.

On top of the central-entrance tower has been built an astronomical observatory to accommodate a telescope which has been presented to the school. Directly beneath the observatory is a classroom or conference room, to be used in connection therewith. As it is anticipated that this observatory will be used by some of the study clubs of the community, an elevator has been run from the vestibule of the main-entrance tower to the roof, to avoid the tiresome climbing of stairs.

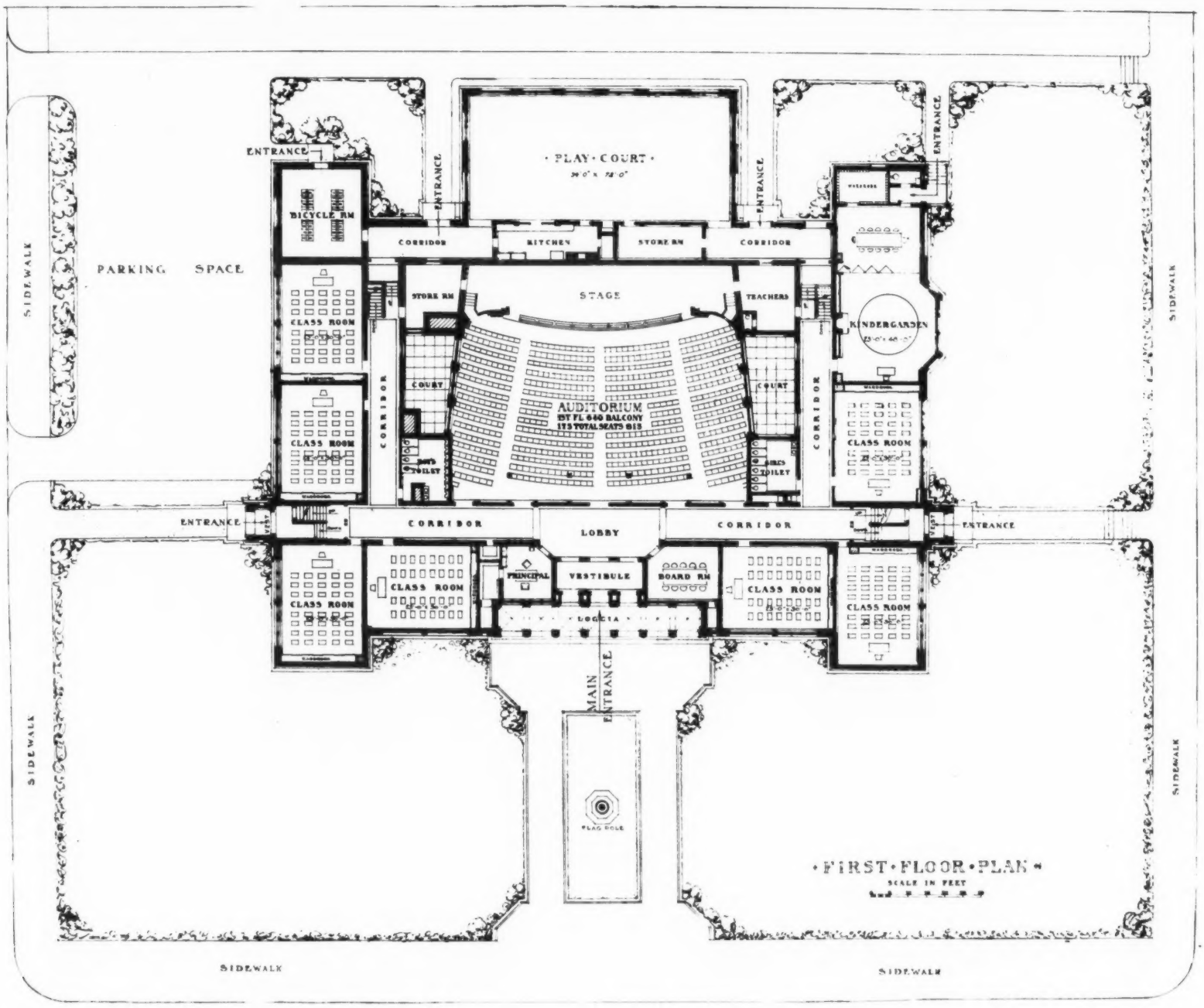
The building has been located on a large plot of ground, which includes a girls' athletic field in the rear. The boys have a large athletic and football field in another part of the town. Special consideration has been given to parking facilities on the property, and a very large area, paved with concrete, has been provided for this purpose. The parking of automobiles around this school is becoming more and more of a problem, not only during the day sessions, but more particularly during entertainments given in the auditorium in the evening. This parking space has been brilliantly illuminated and will be policed when the number of parking automobiles makes it advisable.

The building has a maximum pupil capacity of 1630 pupils. It contains 2,860,000 cubic feet, and cost $1,500,000, exclusive of land and equipment.





CLIFTON AVENUE GRADE SCHOOL, LAKEWOOD, N. J. Guilbert & Betelle, Architects, Newark, N. J.



CLIFTON AVENUE GRADE SCHOOL, LAKEWOOD, N. J. Guilbert & Betelle, Architects, Newark, N. J.

The School Ventilation Studies of the New York Commission on Ventilation

Work During the School Year 1926-27.

Thomas J. Duffield, Executive Secretary, Director of Field Studies, New York Commission on Ventilation

In the January, 1927, issue of the SCHOOL BOARD JOURNAL, the revival of the New York State Commission on Ventilation, which with the exception of the preparation of the report on its earlier studies,[1] had ceased to function in 1917, was announced and reference was made to the new field studies it had undertaken.

More recently the commission, originally an official group appointed by Governor Sulzer in 1913, has reorganized as an independent body and the word "state" has been dropped from its name. There have been two changes in membership, the present composition of the commission being:

C.-E. A. Winslow, Dr. P.H., Anna M. R. Lauder Professor of Public Health, Yale University, New Haven, Conn., Chairman.

Rufus Cole, M.D., director of the Hospital of the Rockefeller Institute for Medical Research, New York.

Dwight D. Kimball, consulting engineer, New York.

Frederic S. Lee, Ph.D., research professor of physiology, College of Physicians and Surgeons, Columbia University, New York.

George T. Palmer, Dr. P.H., research director, American Child Health Association, New York.

Earle B. Phelps, professor of sanitary science, College of Physicians and Surgeons, Columbia University, New York.

Edward L. Thorndike, Ph.D., professor of educational psychology, Teachers College, New York.

The present work of the commission is being financed, as was that of its predecessor, entirely by the Milbank Memorial Fund.

The studies during the school year 1926-27, dealt with two types of schools:

1. The one- and two-room rural schools of Cattaraugus county, New York, and
2. The schools of a medium-size city (approximately 200,000 population) — Syracuse, New York.

The findings of those studies are presented at this time, not as final results, but simply as a progress report and a record of work done. Both studies are being continued during the current school year, under conditions that lead to the hope that the most healthful combination of temperature, humidity, and motion in air conditions of classrooms, and the most satisfactory method of obtaining and maintaining these conditions, may ultimately be determined.

I. General Organization of the Studies

For judging the success of these field studies, the incidence and duration of respiratory illness among the pupils was selected as the criterion. At the same time accurate records of the classroom-air conditions, temperature, humidity, and air motion must be kept. Data relating to the per-capita air and floor space, the methods of heating and ventilation, and the outdoor weather conditions must be collected. And all these facts and their relationships must be studied with the most careful regard for the age, sex, and race stock of the pupils.

For the gathering together of these various elements that enter into our studies, use has been made of the following records:

1. Temperature record.
2. Attendance and health record.
3. Observer's summary of air conditions.
4. School heating and ventilation survey.
5. Age, sex and race-stock distribution of pupils of each class.
6. Outdoor weather data from the United States Weather Bureau.

Only the first two of these records have been required in sufficient quantity to warrant printing them. The inclusions in the observer's record of air conditions have not yet become sufficiently standardized, and the fourth and fifth are used in such small numbers that mimeographed forms have been employed. For the weather records, the standard forms of the Weather Bureau have been used.

[1]Ventilation, 620 pp. E. P. Dutton & Company, New York, 1923.

Form I.

City_____ School month

School_____ From_____ 192____

Room No._____ to_____ 192____

Grade_____ Teacher_____

TEMPERATURE RECORD

DAY OF WEEK	MONTH	HOURS OF OBSERVATIONS — OUTDOOR			INDOOR A.M.				INDOOR P.M.				COMPUTATIONS		REMARKS Note inclement Weather conditions here
		1	2	3	1	2	3	4	1	2	3	4	SUM	AVE.	
Monday															
Tuesday															
Wednesday															
Thursday															
Friday															
SUM															
AVERAGE															
Monday															
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SUM															
AVERAGE															

INSTRUCTIONS CONCERNING THE TEMPERATURE RECORD

The temperature record contains spaces for 5 sessions and 8 in-car readings daily. Outdoor readings are to be made at a carefully selected spot 5 minutes before the opening of each session, and at the end of the afternoon session. (On non-session days in order to have two readings the second may be taken at the end of the session.)

Indoor readings are requested at each session, as follows —

1. When the session opens.
2. Immediately before the mid-session recess or exercise period.
3. Immediately after the mid-session recess.
4. Just before the session ends.

The number at the head of each column corresponds to the time of observation given in the above list. If because of an oversight or for any other reason a reading happens to be omitted, mark a cross (X) in the space where the reading should have been recorded. In any case, never record an estimate of what the reading might have been.

FORM I. FORM FOR TEMPERATURE RECORD.

Form I is the Temperature Record.

Space is provided for recording the outdoor temperatures three times, and the indoor temperatures eight times daily. The outdoor record is made only where the school is located at a considerable distance from any weather-bureau station, and where conditions are so different that the official records would not be representative.

The indoor temperatures are recorded four times at each session by the teacher, or, in the higher grades, by a monitor under the teacher's supervision. If possible, it is desirable to reproduce on the blackboard the form for a week's records and to have the current record kept there. From this the temperatures may be entered on the form daily or weekly. This scheme will not only serve to remind the teacher and pupils that the readings should be made, but the educational value of fixing in the minds of the pupils the idea that room temperatures are important to their well-being is probably far greater than is generally realized.

Form II

City_____ School month

Ward_____ From_____ 192____ to_____ 192____

School No._____ Pupils enrolled to date_____

Room No._____ Teacher_____

ATTENDANCE AND HEALTH RECORD

DAY OF WEEK	DATE MONTH	SESSIONS	PUPILS ON active ROLL 1	PUPILS PRESENT TOTAL	PUPILS PRESENT Write 2 Respiratory Disease	PUPILS ABSENT TOTAL	PUPILS ABSENT Write 2 Respiratory Disease	REMARKS Indicate holidays, non-session days, unusual weather conditions, etc. Also any change of pupils on roll.
Monday		A.M.						
		P.M.						
Tuesday		A.M.						
		P.M.						
Wednesday		A.M.						
		P.M.						
Thursday		A.M.						
		P.M.						
Friday		A.M.						
		P.M.						

FORM II. FORM FOR ATTENDANCE AND HEALTH RECORD.

Form II is the Attendance and Health Record. From the register, the teacher enters the number of pupils on the active roll, the number present, and the number absent for each session. The respiratory illness among the pupils present should be entered by the school physician or nurse. The cause of absence should be determined by nursing follow-up, and cases of respiratory illness among the absentees should be entered in the space provided.

Where medical and nursing staffs are not sufficiently adequate to provide these services, fairly reliable data on the incidence of respiratory diseases may be recorded by the teacher from her observations in the classrooms and from the excuses for absences sent in by the parents, especially if absenteeism is checked up by the school nurses and attendance officers. In fact, this is the method that was followed in each of the commission's studies during the past year.

Although both Cattaraugus county and Syracuse have highly developed school-nursing services for communities of their respective types, the cost of providing sufficient nurses in Cattaraugus county and transportation for them to visit daily all schools in the study to check up respiratory illness among the pupils present and then to visit the homes of absentees to determine the causes of absence, would have been prohibitive. In Syracuse, where the distance difficulties of the rural community do not exist, it was felt by the authorities that the school-nursing service could not undertake any additional work. In both instances, the teachers kept the health records as well as those of temperature and attendance. As the study progressed in Syracuse, the teachers came to depend more and more on the nurses for their health information, although they remained responsible for the recordkeeping.

As was stated above, the incidence of respiratory illness was taken as the criterion in judging the relative healthfulness of school-ventilation systems, and in view of the fact that the determination of the absence or presence of this condition rested with persons not specially trained to qualify them to make decisions in questionable cases, these studies of 1926-27 must be considered simply as preliminary investigations, and they must not be clothed with an unwarranted degree of reliability. On the other hand, in a large number of rooms of each type of ventilation, the personal equations of the teachers would tend to balance, and even in the studies here reported there is no evidence that the teachers' decisions reacted in favor of one type of ventilation over another.

In general, the supplementary observations of air conditions, humidity, air change and air motion, should be made by a special observer, who, in addition to making repeated tests for the determination of these factors, will make the survey of the school building and its heating and ventilating equipment. Once each term, the observer should obtain from each teacher a record of the age and sex of each pupil and the nationality of each pupil's parents. Without these data, attempts to compare the findings of one school with those of another are futile.

Just because City A has a higher crude death rate than City B, one is warranted in saying that City A is less healthful than City B. City A may have a higher proportion of old persons than City B; or it may have in the composition of its population a higher percentage of persons belonging to a race having a higher general mortality rate.

In the same way, one school might have only certain of the lower grades, while another might have classes of the junior high school; one might have a high proportion of pupils of Latin origin, in another those of Slavic ancestors may predominate; while in a third colored pupils might make up a considerable proportion of the attendance. *There is much evidence that these factors have an important bearing on both the incidence of respiratory illness and attendance at school. Studies, which disregard these factors while attempting to determine the comparative healthfulness of different types of school ventilation, may lead to wholly erroneous conclusions.*

II. The Rural-School Ventilation Study in Cattaraugus County, New York

For the information of those persons who have no map of New York State handy, it should be stated that Cattaraugus county borders on the Pennsylvania state line, and is directly south of Buffalo. The county is rec-

TYPICAL ONE-ROOM SCHOOL OF CATTARAUGUS COUNTY, N. Y.

tangular in shape, roughly 38 miles wide and from 30 to 35 miles north and south. It has a population of approximately 75,000 persons, of whom 22,000 live in Olean, and 10,000 in Salamanca. The remainder are scattered rather generally over the area of the county in 33 towns and 13 incorporated villages, the largest of which has a population of approximately 2,000.

In this rural area there are 22 high schools and 247 grade schools; of this latter group, 234 have but one room, and 13 have two rooms. Twenty-two of these schools have an average attendance of less than 5 pupils and 73 have from 6 to 10 pupils. The accompanying photograph shows a typical one-room school.

For the purposes of our study, 48 of these one- and two-room schools were selected in rural-school districts 1 and 2, which include approximately the eastern third of the county. All of the schools are of frame construction, and most of them appear to be subject to high heat losses through walls and ceilings as well as to infiltration of large quantities of cold air through walls, floors, and around windows and doors. Five of the schools had basement heaters, the remaining 43 being heated by stoves, usually without jackets, in the rooms. Wood is the principal fuel; a few schools burn coal and one burns natural gas.

A graduate mechanical engineer, who had been engaged in heating and ventilation work, was placed in charge and under his direction, the recordkeeping was started by the teachers. Two special observers went from school to school to investigate the air conditions, making records of the heat distribution, the relative humidity, drafts, odors, etc., etc. To get an idea of the heat distribution, temperature readings were made at the ceiling (in 17 schools), on the desk tops at the center, and at the four corners of the seating section and on the floor at the center of the seating section. Relative humidities were determined by means of the standard sling psychrometer.

The mean temperatures of the classrooms, as determined by analysis of the temperature records kept by the teachers, ranged from 78.7 to 61.7 degrees Fahrenheit—22 showing averages higher than 70 degrees, and 3 below 65 degrees. Relative humidities ranged from 20 per cent to 60 per cent, depending on the indoor temperature. Desk-top temperatures taken simultaneously on the occasion of a single observation in one room showed a horizontal variation of 46 degrees Fahrenheit. On another occasion, the desk nearest the stove showed a temperature 34 degrees Fahrenheit higher than the room thermometer; while at another time the desk farthest from the stove was in a temperature 31 degrees below that shown by the room thermometer. This same school showed a temperature difference of 33 degrees between the temperature in one corner of the room at the ceiling and the temperature at the floor in the center of the heating section. This does not happen to be a record because other schools showed differences of 55 degrees, 48 degrees, 45 degrees, and 41 degrees between floor and ceiling temperatures taken in the same manner.

Total absenteeism in these 48 schools ranged from 5.2 per cent to 29.5 per cent of the total pupil sessions during the period of this study; respiratory illness was reported as the cause of absenteeism of from 1.0 per cent to 9.7 per cent of the total pupil sessions, but there does not appear to be any direct relationship between the rate or the cause of absenteeism and the mean classroom temperatures. This is apparently not a difficult matter to explain. It has been shown that the room thermometers do not give readings representative of conditions in all parts of the seating section. Pupils are distributed throughout the room and it would require a detailed study of the conditions of each pupil's individual air column and correlation with his attendance and health record before any very reliable relationship of temperature, attendance, and health could be established.

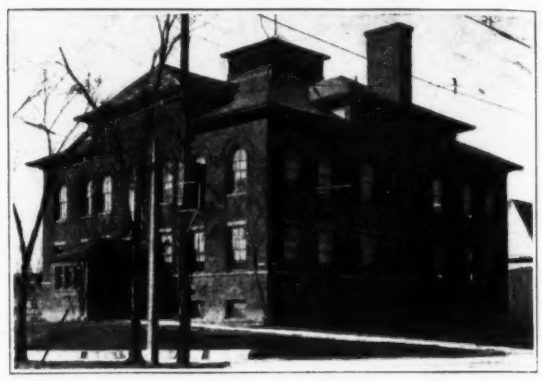
The commission is attacking the problem in another manner. It feels that such varied and variable air conditions should not exist in these rural-school classrooms and, during the current school year, the effort will be made to show how these conditions can be brought more nearly under control. For this purpose, it plans to set up experimental plants in three or more existing schools, in which by combinations of weatherproofing (with insulating materials and weather stripping) and adequate and proper heating units, it can demonstrate to the rural-school trustees of the county how these great extremes, at least, can be avoided. Meanwhile the collection of data in all the schools is being continued.

III. The School-Ventilation Study in a City of 200,000 Population—Syracuse, N. Y.

In Syracuse, different types of school ventilation can be found and a comparative study was possible. It had been planned originally to make such a comparative study, with the incidence of respiratory illness among the pupils as the criterion, between classrooms ventilated by the window-gravity method recommended by the commission in its report, and mechanically ventilated rooms. The schools of Syracuse had no rooms ventilated in accordance with the commissions' recommendations with the result that the study was made with three old furnace-heated schools with gravity exhausts, representing natural ventilation and three modern buildings with fan supply and fan or gravity exhausts representing mechanical ventilation. None of the schools included in the study has artificial humidification.

All the schools are two stories high with brick exteriors. The mechanically ventilated schools have all been built within the past 5 years and are entirely of fireproof construction. The naturally ventilated schools are all more than 40 years old. Floors and stairways are of wood, and the partitions are presumably of the same material with plaster over wood lath.

The mechanically ventilated schools are heated by steam with direct, as well as indirect, radiation. In each of these schools, fresh air is drawn into a ventilating system in the basement through a large brick shaft which opens above the roof. Recirculating grilles from the main corridors on each floor open into this shaft. Hand-controlled and thermostatically-controlled dampers regulate whether the air is to be wholly or partially recirculated or is to be brought entirely from out of doors. The air is



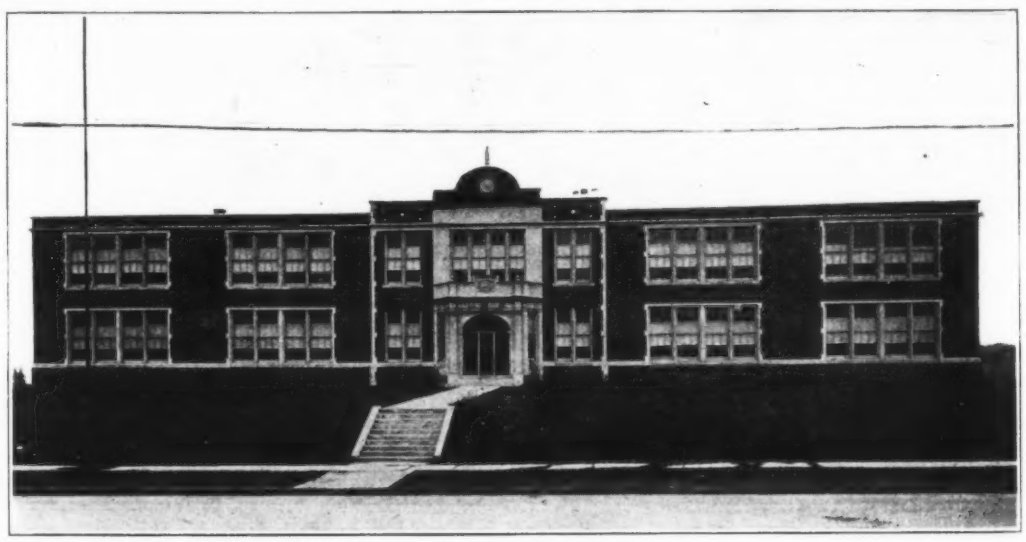
MERRICK SCHOOL, SYRACUSE, N. Y.
Showing the type of the Naturally Ventilated Schools included in the School Ventilation Study 1926-27.

warmed over tempering radiators or by-passed around them, and is forced to the rooms through ducts, of which there are generally two per classroom, opening approximately 10 ft. above the floor. Exhaust is effected through grilles in the bottom of the doors of the clothes closets, from which ducts lead to exhaust-fan chambers on the roof or directly to roof ventilators. Thermostatic-control systems are installed and operated to regulate the admission of steam to the direct and indirect radiators, and to actuate the mixing dampers in the ventilating system.

The naturally ventilated schools are heated by warm-air furnaces. Fresh air is admitted to the ventilating system at grade. It is warmed by passing over the heaters or it is by-passed around them. There are but 4, 5, or 6 rooms per floor in these old schools, and the duct system for delivering air to the rooms is relatively simple. In two of the three naturally ventilated schools, these supply ducts open in an inside wall of the classrooms, approximately 9 ft. above the floor. In the third, which has an old Smead system, they open in the floor or in the wall at the floor. In all these naturally ventilated schools, the exhaust ducts lead to the basements where they connect with ventilating chimneys discharging above the roof. Temperature control in these buildings is entirely manual and it becomes a function of the teacher to open or close the supply or mixing damper. To prevent overheating, windows are usually opened to a greater or lesser degree.

The crude results of this study are summarized in Table I, while Tables II and III present the totals for each of the six schools, the former giving the data for the mechanically ventilated buildings, while Table III shows the same information for the schools with natural ventilation.

From Table I, which gives, in addition to the summarized attendance and health records for the schools of the two types of ventilation, the number of pupils, their average age, the percentage of pupils of American parentage, and the mean temperature of the classrooms, it will be seen that with a total experience, including 366,000 pupil sessions, the mechanically ventilated schools showed an excess of 47 per cent in total absenteeism, an excess of 67 per



SALEM HYDE SCHOOL, SYRACUSE, N. Y.
Showing the type of the Mechanically Ventilated Schools included in the School Ventilation Study 1926-27.

TABLE I—SUMMARIZED ATTENDANCE AND HEALTH RECORDS
According to Type of Ventilation, Syracuse, New York, School-Ventilation Study—1926-27

Item	Attendance and Health Records	Schools With Steam Heat Automatic Temp. Control Mechanical Ventilation	Hot Furnace Heat, Manual Temp. Control Natural Ventilation	Excesses in Mechanically Ventilated Schools
A	Total Pupil Sessions	228,454	137,596	.....
B	Total Absences	16,413	6,768	.....
	Per cent of Total Pupil Sessions	7.2	4.9	47%
C	Absences due to Respiratory Diseases	6,814	2,500	.....
	Per cent of Total Pupil Sessions	3.0	1.8	67%
	Per cent of Total Absences	41	37	11%
D	Pupil Sessions Attended	212,041	130,828	.....
	Per cent of Total Pupil Sessions	92.8	95.1	-2.5%
E	Respiratory Illness Among Pupils Present	28,752	9,621	.....
	Per cent of Total Pupil Sessions	12.6	7.0	80%
	Per cent of Pupil Sessions Attended	13.6	7.4	84%
F	Respiratory Illness Among Pupils Present and Absent	35,566	12,121	.....
	Per cent of Total Pupil Sessions	15.6	8.8	77%
G	Mean Temperature (°F.)	70.0°	68.5°	1.5°
H	Average Age of Pupils, Years	10.3	9.1	1.2
I	Percentage Pupils of American Parentage	72.7	54.6	33%
J	Number of Pupils	1,232	794	.....

Final Figures—Corrected July 1, 1927.

TABLE II—ATTENDANCE AND HEALTH RECORDS
In Mechanically Ventilated Schools, Syracuse, New York, School-Ventilation Study—1926-27

Item	Attendance and Health Records	Schools Included in Study: Salem Hyde	Seymour	Danforth	Total
A	Total Pupil Sessions	33,105	126,464	68,885	228,454
B	Total Absences	2,116	9,704	4,593	16,413
	Per cent of Total Pupil Sessions	6.4	7.7	6.7	7.2
C	Absences due to Respiratory Illness	1,128	3,243	2,443	6,814
	Per cent of Total Pupil Sessions	3.4	2.6	3.5	3.0
	Per cent of Total Absences	53	33	53	41
D	Pupil Sessions Attended	30,989	116,760	64,292	212,041
	Per cent of Total Pupil Sessions	93.6	92.3	93.3	92.8
E	Respiratory Illness Among Pupils Present	6,755	17,234	4,763	28,752
	Per cent of Total Pupil Sessions	20.4	13.6	6.9	12.6
	Per cent of Pupil Sessions Attended	21.8	14.8	7.4	13.6
F	Respiratory Illness Among Pupils Present and Absent	7,883	20,477	7,206	35,566
	Per cent of Total Pupil Sessions	23.8	16.2	10.4	15.6
G	Mean Temperature (°F.)	70.2°	70.1°	69.5°	70.0°
H	Average Age of Pupils, Years	8.3	11.1	9.5	10.3
I	Percentage Pupils of American Parentage	91.8	62.0	85.5	72.7
J	Number of Pupils	146	707	379	1,232

Final Figures—Corrected July 1, 1927.

TABLE III—ATTENDANCE AND HEALTH RECORDS
In Naturally Ventilated Schools, Syracuse, New York, School-Ventilation Study—1926-27

Item	Attendance and Health Records	Schools Included in Study: Montgomery	Merrick	Townsend	Totals
A	Total Pupil Sessions	54,346	41,079	42,171	137,596
B	Total Absences	3,523	1,669	1,576	6,768
	Per cent of Total Pupil Sessions	6.5	4.1	3.7	4.9
C	Absences due to Respiratory Illness	1,089	977	434	2,500
	Per cent of Total Pupil Sessions	2.0	2.4	1.0	1.8
	Per cent of Total Absences	31	59	28	37
D	Pupil Sessions Attended	50,823	39,410	40,595	130,828
	Per cent of Total Pupil Sessions	93.5	95.9	96.3	95.1
E	Respiratory Illness Among Pupils Present	4,920	2,447	2,254	9,621
	Per cent of Total Pupil Sessions	9.1	6.0	5.4	7.0
	Per cent of Pupil Sessions Attended	9.7	6.2	5.6	7.4
F	Respiratory Illness Among Pupils Present and Absent	6,009	3,424	2,688	12,121
	Per cent of Total Pupil Sessions	11.1	8.4	6.4	8.8
G	Mean Temperature (°F.)	71.7°	68.3°	65.8°	68.5°
H	Average Age of Pupils, Years	9.9	8.9	8.2	9.1
I	Percentage Pupils of American Parentage	65.0	91.4	4.6	54.6
J	Number of Pupils	325	232	237	794

Final Figures—Corrected July 1, 1927.

cent in absenteeism due to respiratory illness, and an excess of 80 per cent of pupil sessions attended with respiratory illness. Pupils in mechanically ventilated schools showed an excess of 77 per cent in all respiratory illness among pupils present and absent.

The average age of the pupils in the mechanically ventilated schools is higher as is also the percentage of pupils of American parentage. Have these factors any bearing on the results?

Table IV shows the average total absenteeism by grades for each school. In those of the more homogeneous populations, Salem Hyde, Danforth, Merrick, and Townsend, there appears to be a definite relationship between grade (age) and absenteeism: the higher the grade, the lower the rate of absence. The two other schools, after showing this same tendency in the early grades, show increasing absenteeism above the fourth or fifth grade, but it does appear quite clear that the age distribution of the pupils in the schools will affect the total absenteeism.

TABLE IV—AVERAGE ABSENTEEISM BY GRADES[1]
Mechanically Ventilated Schools
School-Ventilation Study—Syracuse, N. Y., 1926-27

School	Grades 2	3	4	5	6	7	8	School Av.
Salem Hyde	8.3	7.3	5.9	5.1	—	—	—	6.4
Seymour	9.1	8.4	6.2	5.5	6.6	8.6	9.3	7.7
Danforth	7.1	8.7	6.9	5.8	5.1	—	—	6.7
Grade Averages	8.3	8.3	6.3	5.5	6.0	8.6	9.3	7.2

Naturally Ventilated Schools

School	Grades 2	3	4	5	6	7	8	School Av.
Montgomery	5.8	5.2	7.7	6.1	7.1	—	—	6.5
Merrick	4.8	4.5	4.1	3.6	3.0	—	—	4.0
Townsend	4.6	2.8	—	—	—	—	—	3.7
Grade Averages	5.0	3.9	6.5	4.6	5.8	—	—	4.9

[1]Per cent of Total Pupil Sessions.

Table V shows the respiratory illness absenteeism for each grade in each school in the study. Although the relationships are not nearly so uniform, it appears that the lower grades generally show higher rates of absenteeism due to respiratory illness, and comparisons of the rates for the same grades in the various schools, brings out the fact that the higher rates of respiratory illness absenteeism are almost always found in the mechanically ventilated schools.

TABLE V—AVERAGE RESPIRATORY ILLNESS ABSENTEEISM BY GRADES[1]
Mechanically Ventilated Schools
School-Ventilation Study—Syracuse, N. Y., 1926-27

School	Grades 2	3	4	5	6	7	8	School Av.
Salem Hyde	3.7	4.1	3.3	2.9	—	—	—	3.4
Seymour	2.8	2.8	2.4	1.7	2.3	1.8	3.8	2.6
Danforth	5.2	5.1	2.9	3.5	1.4	—	—	3.6
Grade Averages	3.7	3.7	2.8	2.7	1.9	1.8	3.8	3.0

Naturally Ventilated Schools

School	Grades 2	3	4	5	6	7	8	School Av.
Montgomery	2.0	1.5	2.0	1.4	2.6	—	—	2.0
Merrick	2.4	3.3	2.3	1.2	1.8	—	—	2.4
Townsend	1.1	0.9	—	—	—	—	—	1.0
Grade Averages	1.6	1.7	2.1	1.3	2.3	—	—	1.8

[1]Per cent of Total Pupil Sessions.

What of race stock? Under Item C in Tables II and III, the last line shows the percentage of total absenteeism due to respiratory illness. If these percentages are studied, together with the percentage of pupils of American parentage, it will be seen that the high ratios of respiratory illness absenteeism to total absences occur in schools in which the attendance comprises relatively more pupils of American parentage. Townsend, a naturally ventilated school, having second and third grades only, and attended almost exclusively by pupils of Italian parentage, showed not only the lowest rates of total and respiratory illness absenteeism, but the lowest rate of respiratory illness among the pupils present as well. Incidentally, this school had the lowest average temperature (65.8 degrees Fahrenheit), but without a control, it is impossible to say whether this favorable showing was due to the type of ventilation, the low temperature, or the race stock.

It is because of these findings that the warning was sounded and that no study of this nature will be convincing unless the factors of age and race stock are compensated.

This story might end here without any tentative conclusions or other suggestions for the guidance of further studies had it not been for the fact that the data were collected in such a manner as would permit its study in relation to the outdoor weather conditions and had it not been possible to group certain of the schools with different types of ventilation in such a manner as will compensate these factors of age and race stock.

The relationship between the outdoor weather conditions and the attendance and health records are presented in Charts I and II.

In Chart I, the upper curve shows for each week of the study the difference, in degrees Fahrenheit, between the average indoor temperature, 70 degrees, and the average daytime outdoor temperature from Monday to Friday, these being the only days on which school conditions will affect the pupils. This temperature-difference curve is also an inverted outdoor-temperature curve, high points on the curve represent low outdoor temperatures, whereas low points on the curve indicate higher outdoor temperatures. The advantage in inverting the

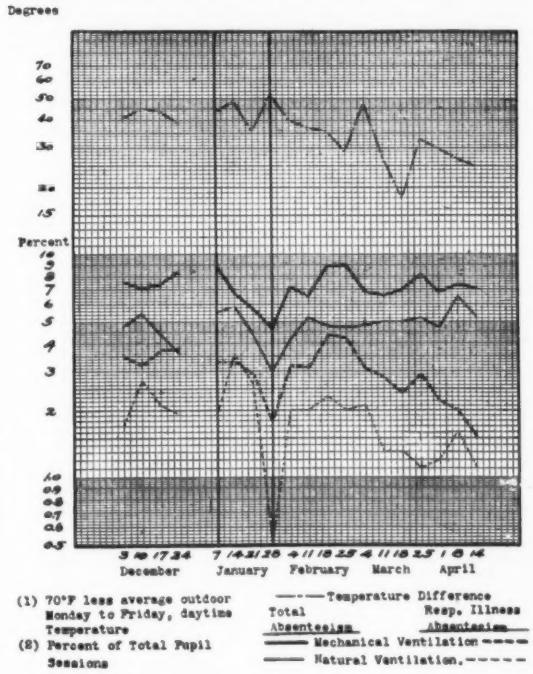


CHART I. TEMPERATURE DIFFERENCES AND ABSENCES.

temperature curve is that it then tends to follow the same general direction as the seasonal curve of respiratory illness.

The next two curves (second and third from the top) are, respectively, the curves of total absenteeism in mechanically and naturally ventilated schools. For every week of the entire study, the naturally ventilated schools showed less absences than did the mechanically ventilated schools. The two lowest curves show that respiratory illness absence rates in the two types of schools; the lowest, that of the naturally ventilated schools, is below that for the mechanically ventilated schools in 18 of the 19 weeks of the study. Comparison of the slopes of these curves week by week with the inverted temperature curve shows relatively few instances of parallelism. Outdoor temperatures appear to have no effect whatever on total absenteeism. There is a general parallelism between the temperature-difference curve and the curves of respiratory-illness absenteeism, but aside from this general correspondence, there are so many contradictory tendencies as to suggest that, although there appears to be more respiratory illness during cold weather, there are probably other causes more definitely responsible for the development of respiratory illnesses.

(Concluded on Page 160)

An Achievement in School Construction

With Costs Running as Low as $253 Per Pupil for Thoroughly Modern and Fireproof Schools, Philadelphia Believes It Has Established a National Record for Economy Without the Sacrifice of Architectural Beauty

Virgil L. Johnson, Chief Structural Engineer, Philadelphia, Pa.

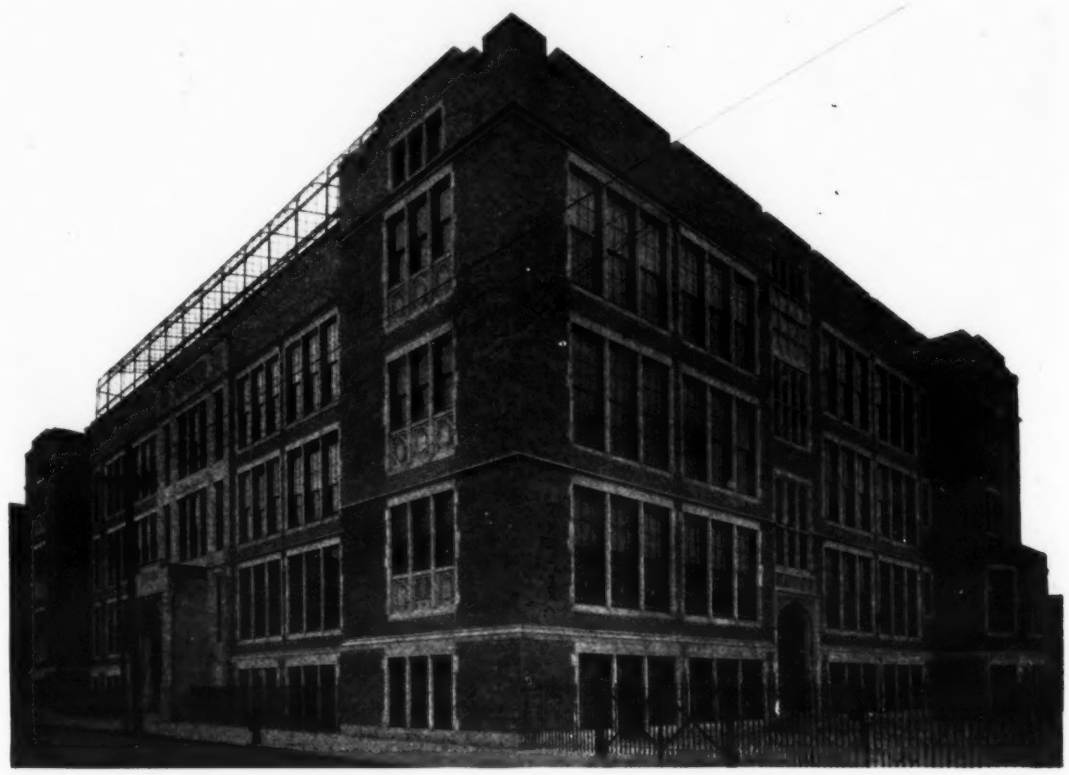
Educational buildings in which children spend a great part of the early years of their lives should embody to a high degree the features of great fire resistance, structural strength, scientific lighting, adequate heating and ventilation, and satisfactory sanitary provisions. In addition to these features, the best should be obtained to produce such buildings at a minimum expenditure of public funds.

Philadelphia's new schools have pointed the way toward the ultimate in this class of structure. The work of the school board and its architects has attracted nation-wide attention. Inquiries have come from all over the country for information regarding its methods of dealing with the several phases of the school-building problem.

For the past six years Philadelphia has been building modern and thoroughly fireproof schools at a lower cost per pupil and a lower cost per cubic foot than any other city in the United States with which it may reasonably be compared. So far as a fairly exhaustive survey has developed, there is no city of any size that can come close to Philadelphia's record for building schools that are at once modern, fireproof, and low in cost. In a $42,000,000 school-construction program that has been under way for the past five years the taxpayers of this city have been saved approximately $5,000,000—the equivalent of about ten new and fully equipped elementary schools. Two things have made this record possible.

1. Standardized specifications and standardized building methods, particularly the adoption of the reinforced concrete skeleton type of construction, have brought about a saving of $3,500,000.

2. The fact that the board of education has its own engineering and architectural staff which handles all details, including inspection, has meant the saving of another $1,500,000.



JAMES R. LUDLOW SCHOOL, PHILADELPHIA, PA.

Designed by and erected under the supervision of the Department of Buildings, Philadelphia Board of Public Education. Contract awarded March 8, 1926. Building completed March 1, 1927. Total cost $499,356. Cost per cubic foot 44.7 cents. Pupil capacity 1,665. Cost per pupil $299.

Quality and Beauty Not Sacrificed

Philadelphia's saving on school construction has not been accomplished at the sacrifice of architectural beauty or variety of design. No two schools are exactly alike and many of them are of decidedly handsome architectural proportions. Aside from their structural quality, Philadelphia's schools lack nothing in modern appointments, efficient equipment, or practical interior layout.

ELIZA B. KIRKBRIDE SCHOOL, PHILADELPHIA, PA.

Designed by and erected under the supervision of the Department of Buildings, Philadelphia Board of Public Education. Contract awarded June 9, 1925. Building completed August 1, 1926. Cost $486,437. Cost per cubic foot 42.6 cents. Cost per pupil $270. Pupil capacity 1,800.

While the cost of schools in other cities is ranging very close to $1,000 per pupil and well over $500 in the average large city, Philadelphia is building schools 100 per cent fireproof for as low as $253 per pupil. The cost per cubic foot is ranging as low as $0.40.

Tables 1, 2, and 3 illustrate typical costs of schools in Philadelphia.

With the $42,000,000 which the Philadelphia board of education has spent for new construction in the last six years, there were built 43 elementary schools, accommodating 51,309 pupils at a total cost of $17,635,667; 18 junior high schools, accommodating 31,890 pupils, at a cost of $16,880,979; and 2 senior high schools, accommodating 7,550 pupils, at a total cost of $4,284,141. From this it will be seen that the average per-pupil cost has been $343 for the elementary schools, $528 for the junior high schools, and $567 for the senior high schools.

As was indicated previously the greatest saving to Philadelphia taxpayers in the new school program was the adoption of the concrete-skeleton-frame type of construction. In addition to the financial saving, this method has also meant more rapid progress in construction, an important item in a city where school facilities are not equal to the demand.

Under the supervision of the department of building, the Philadelphia school board has built schools, equipped them and accepted them within a period of ten months after excavation was begun. The usual time required for buildings of this size when the brick wall-bearing type of construction was used was from 18 to 20 months—almost double the time now required. It is estimated that an average of not less than $20,000 has been saved on each 30-room schoolhouse of the new type, by taking advantage of the economy of reinforced concrete columns, beams, and floors. The use of a reinforced concrete frame throughout permits

a marked reduction in the size of the structure, without sacrificing any of the space required for classrooms, corridors, and stairs. The reduction in size is brought about through the elimination of the heavy brick walls which carried the building loads in the older schoolhouses. The architect has effected a saving in building height through the minimum thickness and careful design of the reinforced concrete floors. This saving in floor thickness has reduced the height of the larger school buildings by as much as 7 to 9 feet.

Reducing Part-Time Attendance

The program to give Philadelphia modern school buildings and an educational system that would hold its own with the best in the country was launched in March, 1922. In a recent statement the superintendent of schools agreed that the building program must continue unabated for years to come, at least until the part-time evil is eliminated entirely in all schools and "the urgent problem of ample provision for senior-high-school students is solved."

Part-time, according to educators, is more acute today in the senior high schools than in the elementary schools. Progress made in eliminating part-time—a condition that exists in any growing community—is sometimes slow. It is a question whether it can be entirely eliminated.

At the time the building program was started, 40,000 pupils were receiving three hours instructions daily in Philadelphia's public schools. Today there are only about 7,000 cases of part-time.

When the building projects now under way are completed in Philadelphia, it is expected that the number of pupils attending part-time or shortened sessions will be reduced to 4,000. This is slightly more than one per cent of the enrollment in all grades.

Splendid progress has also been made in reducing the number of oversize classes. In 1922 there were 1,200 classes of 50 or more pupils to a teacher. Today the average class enrolls 38 children.

As the new building program has progressed, old, obsolete, insanitary and otherwise unfit buildings have been abandoned. Since 1922, a total of 35 old school buildings have been vacated. A number of others are on the program for early vacation.

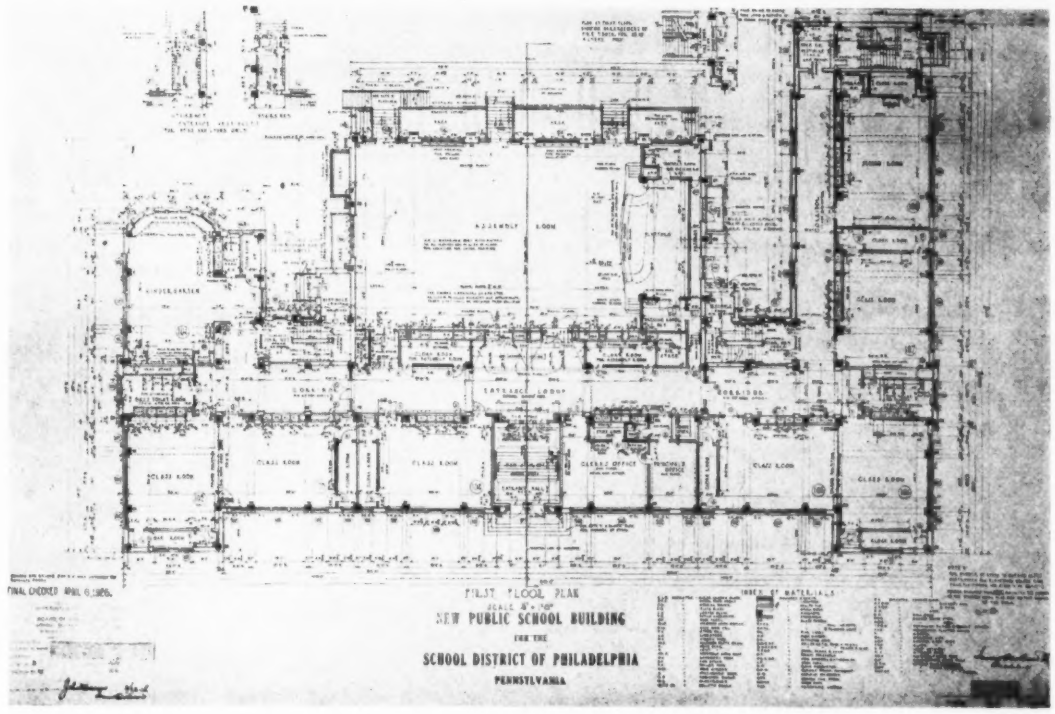
The status of enrollment in the schools here is indicated in a board-of-education estimate which shows a 20 per cent increase in the higher grades (grades 7 to 12) in the last 5 years. In 1922 there were 61,000 pupils enrolled in these grades. At the end of the last spring term there were 72,420. The grades from 1 to 6 remained stationary. The total enrollment at the beginning of the fall term in 1927 was 350,000 pupils.

In this connection it will be interesting to quote from an editorial in the Philadelphia Evening Bulletin (Sept. 10, 1927) in which tribute is paid to those who have given Philadelphia a public-educational system second to none in the country.

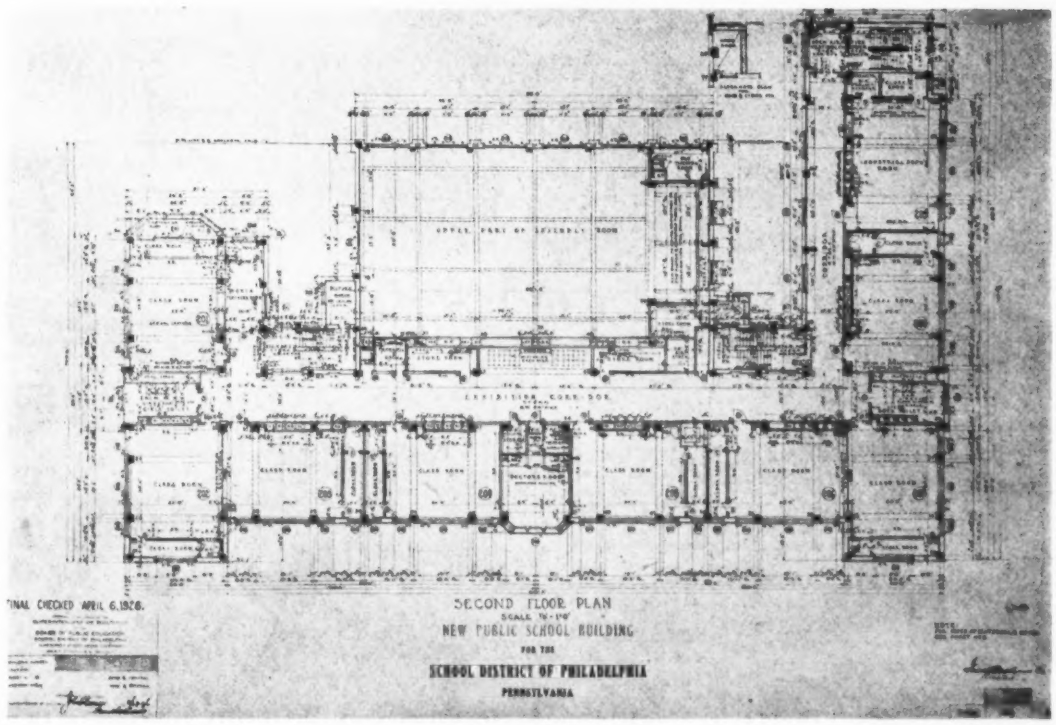
"The board of education is responsible for the expenditure of a larger sum of money than is allotted to any other division of communal service. It has a larger payroll than any other section of the public administration. It has an exclusive power in greater degree than other branches of the government.

"The board of education operates efficiently and economically. Its achievements in the rebuilding of the school-housing plant, which has been carried on without the tooting of trumpets, constitute a progressive program of public works, which is not excelled by any other municipal undertaking within the city. It is doubtful if it can be matched elsewhere in the country. The public-school buildings of Philadelphia, the new construction now being dominant, are the admiration of visitors to the city, and should be a matter of pride for citizens. Rapid increase in school attendance, notably in the

GEORGE WOLF SCHOOL, PHILADELPHIA, PA.
Contract let April 13, 1926. Building completed April 13, 1927. Cost $550,684. Cost per cubic foot 44.8 cents. Cost per pupil $437. Total pupil capacity 1,260.



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.
GEORGE WOLF SCHOOL, PHILADELPHIA, PA.

higher elementary and secondary grades, has been by increased accommodations, and the part-time classes are being reduced to the vanishing point. Moreover, new buildings have been substituted for old, so that the mark of unfitness which was to the discredit of Philadelphia's schoolhousing is almost entirely erased. A considerable part of the liberal expenditures for these new school buildings has been provided out of current revenue, keeping bond issues and debt burdens to a minimum. And withal, the operations of the board, under efficient business management, are kept strictly to a budget plan, in which deficits are impossible."

Important Construction Details

The balance of this paper will deal with a more intimate description of school construction in Philadelphia, for the benefit of those who want technical details.

There are certain fundamental principles which must be considered in every step in the design and construction of school buildings. Some of these principles are regulated by state laws, such as size of classrooms, heating and ventilation, floor and window space, etc. But in addition to these, there are other requirements which must be considered as basic and which are equally important. They are (*a*) circulation, (*b*) acoustics, (*c*) supervision, and (*d*) economical construction.

a) *Circulation* has to do with the planning or grouping of the different activities in such a manner that there may be a minimum amount of lost time for the pupil or instructor in going to and from the central activities of the school.

RUSSELL H. CONWELL SCHOOL, PHILADELPHIA, PA.
Designed by and constructed under the supervision of the Department of Buildings, Philadelphia Board of Public Education.

NEW SCHOOL BUILDINGS PLACED UNDER CONTRACT IN PHILADELPHIA SCHOOL DISTRICT - 1925

TYPE NO.	DATE AWARDED	NAME OF SCHOOL	LOCATION	TOTAL[1] COST OF BUILDING	CUBAGE	COST PER CU.FT.	PUPIL CAPACITY	COST PER PUPIL	DATE COMPLETED
145	5-12-25	Emlen	Chew & Upsal	$ 482,805	1,117,205	$.432	1,275	$351	8- 1-26
148	10-13-25	Reynolds	23rd & Jefferson	444,134	1,059,147	.4193	1,755	253	11- 1-26
149	6- 9-25	Conwell	Jasper & Clearfield	462,674	1,130,366	.408	1,125	410	8- 1-26
143	6- 9-25	Kirkbride	7th & Dickenson	486,437	1,139,448	.426	1,800	270	8- 1-26
146	7- 7-25	Stanton	17th & Christian	332,812	758,000	.438	1,125	295	7- 1-26
146	7- 7-25	Wister	8th & Parrish	332,818.13	758,000	.439	1,125	295	1- 1-27
J.H.S.- 6	11-10-25	Gillespie	18th & Pike	1,148,634	2,306,179	.409	1,960	586	
J.H.S.- 6	12- 8-25	Shoemaker	53rd & Media	1,238,341	2,877,809	.43	1,960	631	4- 1-27
S.H.S.-28	9- 8-25	Gratz	17th & Luzerne	2,113,950	5,295,000	.399	3,750	560	1- 1-27
T.S.- 1	3-10-25	Trade School	13th & Brandywine	1,019,026	2,239,083	.45	1,200	849	10-14-25
22 GDH	4-14-25	Gtn. High Gym	Gtn.Ave. & High St.	82,481.53			125		
TOTAL				$8,144,112.66	19,180,287		17,300		
AVERAGE						$.425		$450	

[1]Includes: Heating, Ventilation, Electric & Plumbing Contracts But No Lot Treatment or Furniture

NEW SCHOOL BUILDINGS PLACED UNDER CONTRACT IN PHILADELPHIA SCHOOL DISTRICT - 1926

TYPE NO.	DATE AWARDED	NAME OF SCHOOL	LOCATION	TOTAL[1] COST OF BUILDING	CUBAGE	COST PER CU.FT.	PUPIL CAPACITY	COST PER PUPIL	DATE COMPLETED
147	1-12-26	Stevens	13th & Spring G'rd'n	$ 530,835	1,162,123	$.456	1,170	$453	3-1-27
J.H.S.-6	2- 9-26	Tilden	66th & Elmwood	1,241,087	2,877,809	.431	2,040	608	
J.H.S.-6	2- 9-26	Fitzsimons	26th & Cumberland	1,221,992	2,877,809	.424	2,040	599	
151	3- 9-26	Ludlow	6th & Master	499,356	1,114,748	.447	1,665	299	3-1-27
146	4- 1-26	Darrah	17th & Folsom	365,731	768,866	.473	980	373	
150	4-13-26	Wolf	82nd & Lyons	559,684	1,227,848	.448	1,260	437	
152	7-13-26	Boone	Hancock & Wilde	387,698	804,066	.482	515	753	
145	7-13-26	Pennell	Ogontz & Nedro	503,880	1,117,205	.452	1,440	349	
J.H.S.-7	9-14-26	Barratt	16th & Wharton	1,180,315	2,831,849	.413	1,890	624	
153	10-11-26	Harrington	53rd & Baltimore	428,540	862,017	.484	990	432	
153	11- 9-26	Houston	Allens & Rural	435,547	898,311	.484	1,125	387	
144	12-14-26	Hopkinson	L & Luzerne	543,497	1,260,270	.431	1,575	345	
95	7-13-26	Olney Wings	Tabor & Water	234,603	535,375	.435	1,125	208	
TOTAL				$8,198,765	B,338,296		B,265		
AVERAGE						$.447		45	

[1]Includes: Heating, Ventilation, Electric & Plumbing Contracts But No Lot Treatment or Furniture

NEW SCHOOL BUILDINGS PLACED UNDER CONTRACT IN PHILADELPHIA SCHOOL DISTRICT - 1927

TYPE NO.	DATE AWARDED	NAME OF SCHOOL	LOCATION	TOTAL[1] COST OF BUILDING	CUBAGE	COST PER CU.FT.	PUPIL CAPACITY	COST PER PUPIL	DATE COMPLETED
J.H.S.-8	1-11-27	Wagner	18th & Chelten	$1,186,207	2,746,450	$0.430	2,040	$579	
J.H.S.-8	2- 8-27	Wilson	Cottman & Loretta	1,162,686	2,746,450	.422	2,040	568	
S.H.S.-22	2- 8-27	W.Phila.Add.	48th & Walnut	235,221	562,350	.418			
145	3- 8-27	Belmont	41st & Brown	484,713	1,117,205	.436	1,440	336	
153	4-12-27	Smedley	Pratt & Mulberry	444,741	898,311	.494	1,125	396	
128	5-10-27	Birney Wing	9th & Lindley	153,421	362,159	.423	675	223	
J.H.S.-6	6-14-27		Thomp. & Montg.	1,195,364	2,877,809	.414	1,960	607	
103	7-12-27	Vare	Morris & Moyamens'g	210,771	380,000	.552	540	389	
T.S.-2	8-16-27	Mastbaum	Fkd. & Clementine	1,132,213	2,615,614	.431	1,500	752	
J.H.S.-9	8-16-27	Furness	3rd & Mifflin	436,783	852,149	.512	640	681	
146	9-13-27		12th & Ogden	363,793	802,810	.452	1,080	336	
TOTAL				7,005,913	15,961,307		13,040		
AVERAGE						.440		$521	

[1]Includes: Heating, Ventilation, Electric & Plumbing Contracts But No Lot Treatment or Furniture

b) The *acoustics* of every room as well as of the corridors must be carefully considered. The architect must be concerned with the surface and covering of all floors, walls and ceilings, as well as their shape and contour if he wishes to avoid "reverberations," "dead spots," and "focal points."

c) All rooms and parts of the building must be so arranged that *supervision* can be conducted without taxing the work of the faculty.

d) *Economical construction* is concerned with proper use and selection of building materials. Besides the safe construction of the building, the engineer should provide against vibrations of any kind and against dangers of windstorms and tornadoes, which will be considered in a later paragraph.

All the foregoing laws and principles must necessarily affect the plan and design of schools. Often they create problems and limitations which the architect and the engineer must meet and overcome. These requirements necessitate buildings so complicated in structure that a costly delay may take place in their actual construction if means are not taken to avoid it.

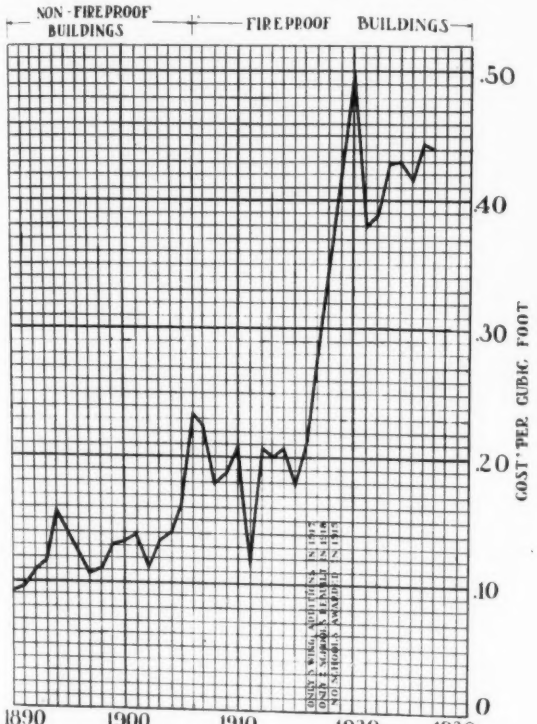
Limited Standardization Valuable

Because of these restrictions the architect is forced to standardize his designs, at least insofar as layout and structural features are concerned. An arrangement of classrooms, flues, cloakrooms, and corridors that will be economical and convenient must be found, and in the end the best arrangement will be adopted. The department of buildings of the Philadelphia school board has met this problem of standardization by considering every distinctly new design as a certain "type" and giving that type a number. Thus it is possible with a few changes and adjustments to repeat a type several times, and, as the buildings of a type are well distributed over the city, the location and lot treatment insure an abundance of individuality and character.

The standardization of office work has been carried into the details, and the department has for its use some three hundred standard detail sheets which have been developed by research and actual field experience. It is through these details and type drawings that the overhead charges of the department, including inspection, has been kept to a minimum cost of two and

one-half per cent of the school contracts—an item that should interest every taxpayer.

In a further discussion of economical construction, the subject of the application of standardization to the erection of school buildings is of vast importance. Of course, the Philadelphia department of school buildings is fortunate in having a background of years of experience so that the board understands very definitely the requirements and the limitations in selecting any new or modern type of con-



TREND OF BUILDING COSTS SINCE 1890
PHILADELPHIA PUBLIC SCHOOLS

struction. It is necessary, therefore, before placing vast sums of money into any school program to make a thorough and exhaustive investigation into the proper type to be used. This investigation and research work is being carried on, and no material of any kind is specfied without investigation.

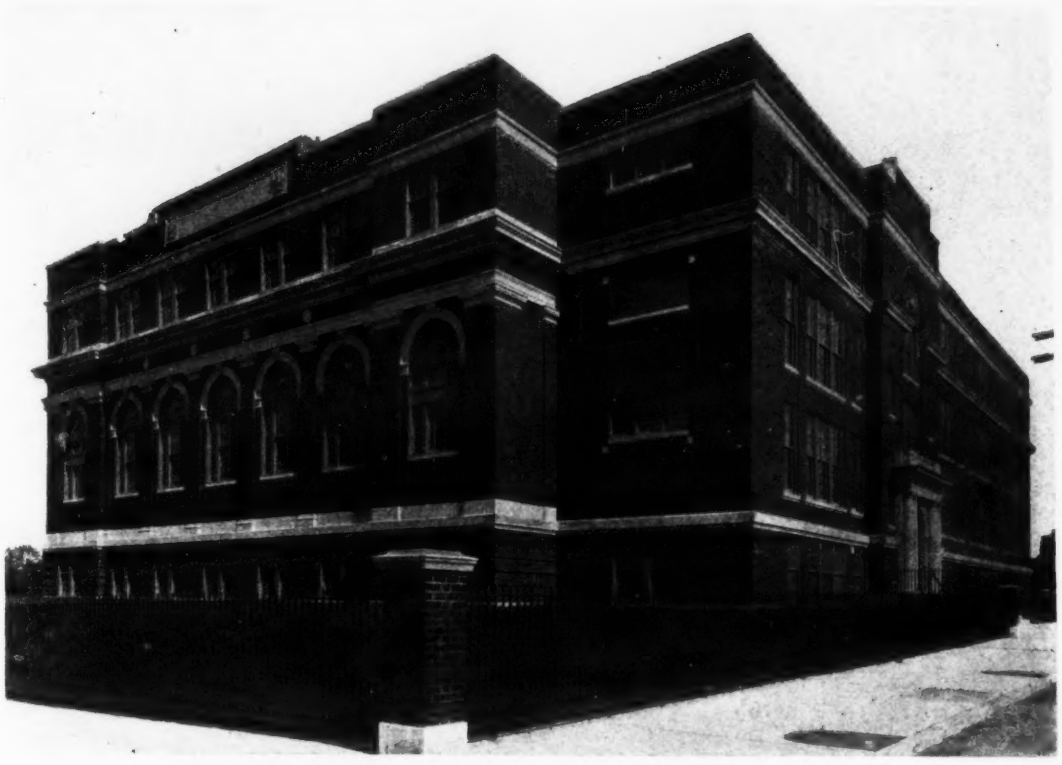
As already mentioned, the type of construction known as "reinforced concrete skeleton frame" was selected as the most economical for the buildings erected during the past six years. This type was adopted because fundamentally it possessed a combination of qualities, such as rigidity, speed in construction, and low cost of production. In addition it also had the qualities of being thoroughly fireproof (not merely fire resisting), of being waterproof, soundproof, and resisting the wear and tear of ordinary abuses to which school buildings are subjected.

Rigid Construction Insured

Rigidity of construction is an essential feature of all school buildings. Concrete construction of the monolithic type is especially well adapted for use in schoolhouses because it can be so designed that there will be no vibration in any part of the building, either from school activities or from the traffic of the adjoining street and subway. The marching of children, dancing, or gymnasium and other athletic activities should in no way cause annoyance to classwork of adjoining rooms or in rooms immediately below.

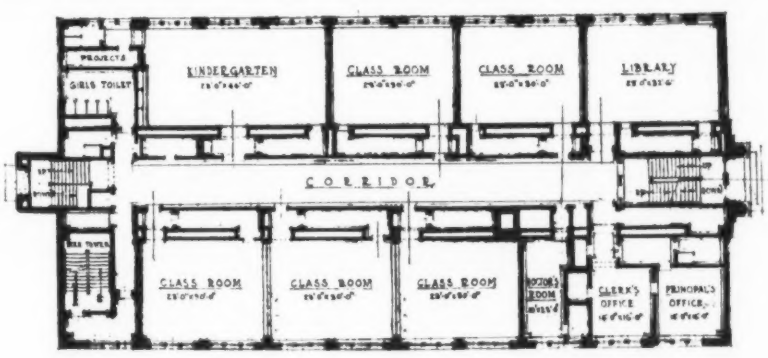
Furthermore in concrete construction there is great lateral stability, insuring safety against all disturbances such as windstorms, tornadoes, and earthquakes.

The details of the construction are given in the following manner: In general, the classrooms are usually 30 ft. long in the clear so that the spacing of columns is 15 ft. 2 in. The

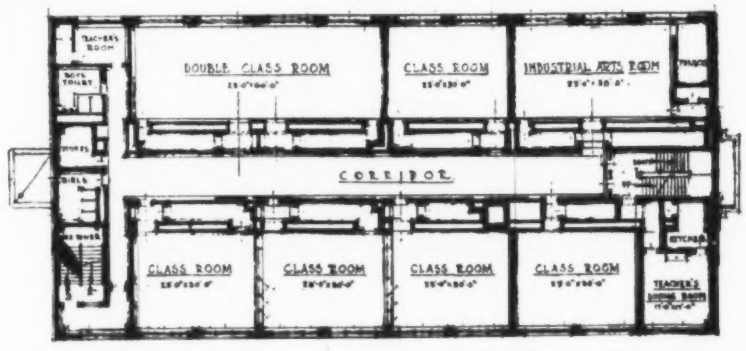


HAMILTON DISSTON SCHOOL, PHILADELPHIA, PA.
Designed by and erected under the supervision of the Department of Buildings, Philadelphia Board of Public Education.

THADDEUS STEVENS SCHOOL OF PRACTICE, PHILADELPHIA, PA.
This is the Practice School of the Philadelphia Teachers' Training School. The cost of $453 per pupil is explained by the fact that special facilities must be provided for teacher practice work. Designed by the Department of Buildings, Philadelphia Board of Public Education.



FIRST FLOOR PLAN

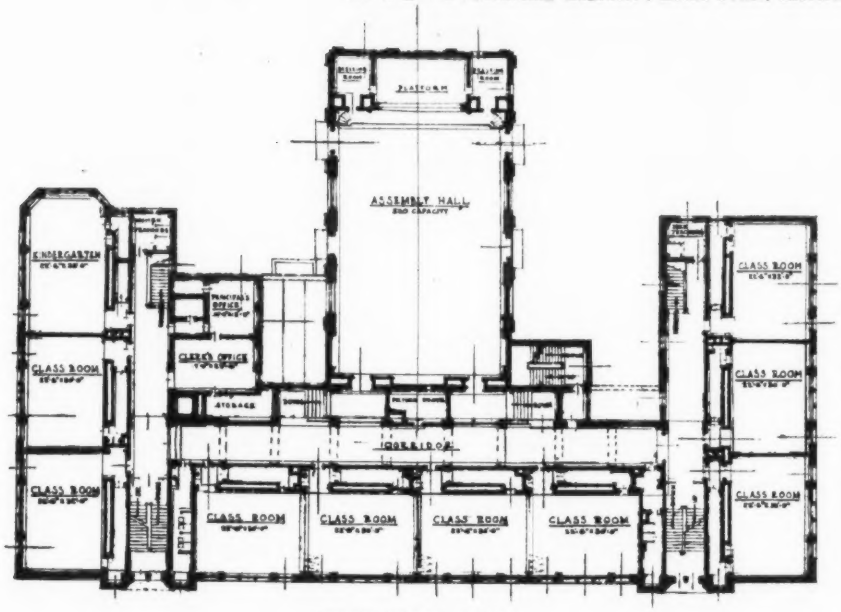


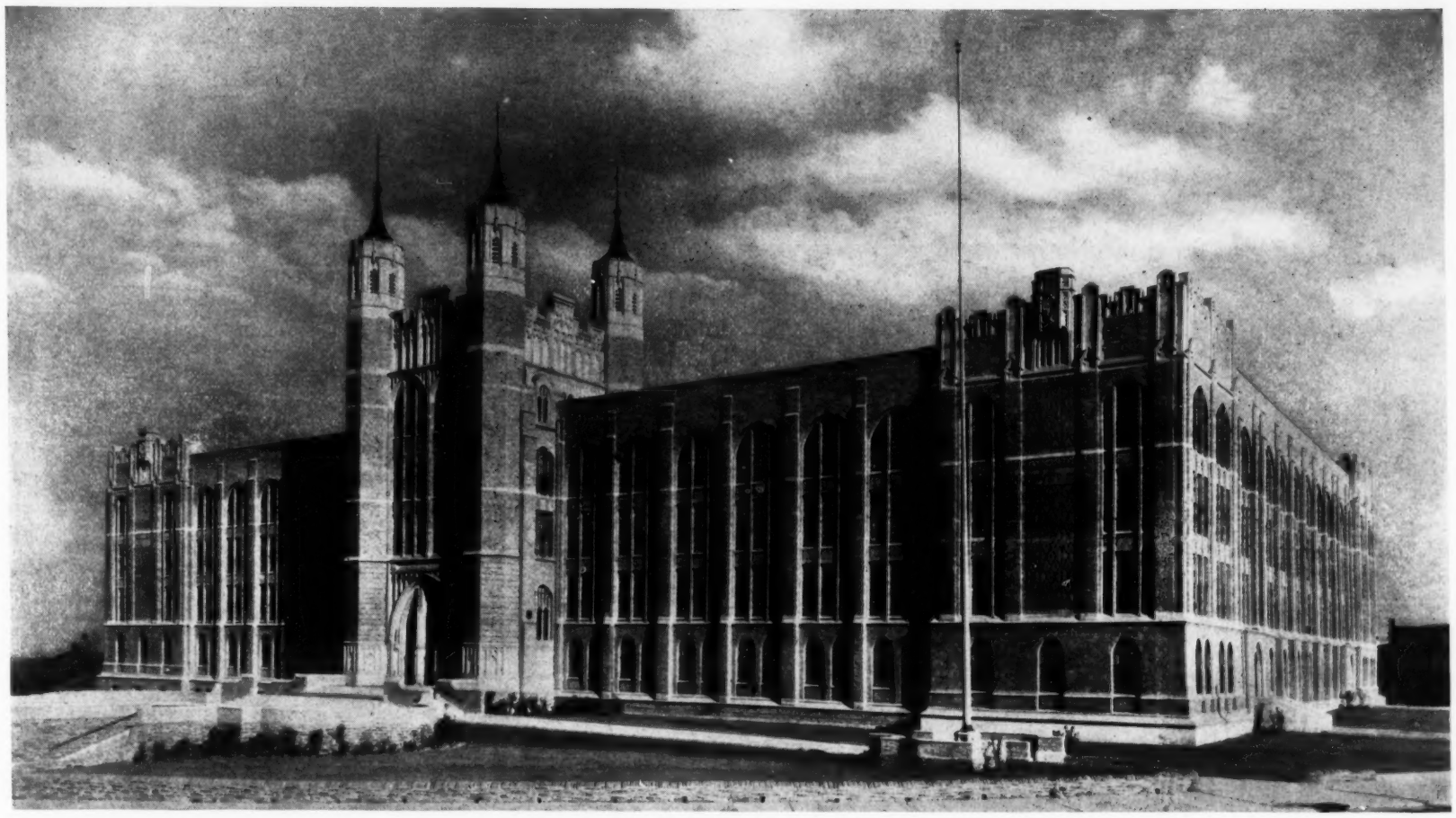
SECOND FLOOR PLAN

FLOOR PLANS OF THE RUSSELL H. CONWELL SCHOOL, PHILADELPHIA, PA. (See Page 62.)

CLARA BARTON SCHOOL, PHILADELPHIA, PA.

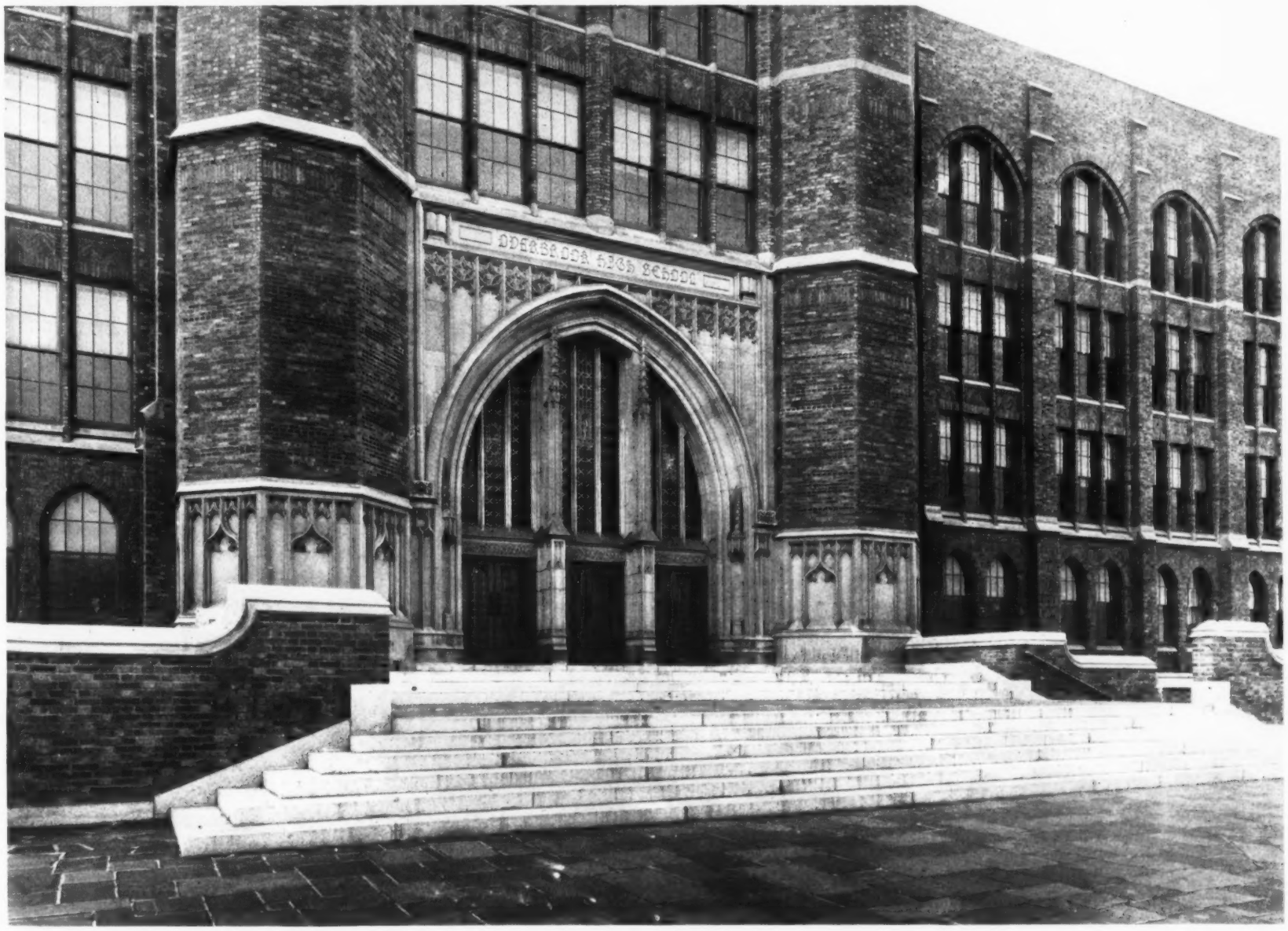
Designed by and erected under the supervision of the Department of Buildings, Philadelphia Board of Public Education. John D. Cassel, Superintendent of Buildings; James Gaw, Assistant Superintendent of Buildings; Irwin T. Catharine, Architect; Virgil L. Johnson, Structural Engineer; Robert M. Peterman, Heating and Ventilating Engineer; Leslie Jones, Electrical Engineer; Bartley C. Reuter, Sanitary Engineer.


PLATFORM
ASSEMBLY HALL
KINDERGARTEN
CLASS ROOM
CLASS ROOM
CLASS ROOM



OVERBROOK SENIOR HIGH SCHOOL, PHILADELPHIA, PA.

This senior high school building, designed by and erected under the supervision of the Department of Buildings, Philadelphia Board of Public Education, is a senior high school and occupies a commanding site in the Overbrook district at 59th and Lancaster Avenues. The contract for the building was awarded December 22, 1924, and the building was completed and occupied December 16, 1926. The building has a total cubic content of 5,226,000 cubic feet and cost 39.9 cents per cubic foot. The total cost was $2,190,191. On the basis of a normal pupil capacity of 3,800 the cost was $571 per pupil.



DETAIL OF ENTRANCE,
OVERBROOK SENIOR HIGH SCHOOL, PHILADELPHIA, PA.

Designed by and erected under the supervision of the Department of Buildings, Philadelphia Board of Public Education: John D. Cassel, Superintendent of Buildings; James Gaw, Assistant Superintendent of Buildings; Irwin T. Catharine, Architect; Virgil L. Johnson, Structural Engineer; Robert M. Peterman, Heating and Ventilating Engineer; Leslie Jones, Electrical Engineer; Bartley C. Reuter, Sanitary Engineer.

is always at an advantage, because floor after floor can proceed without interfering with the work of the bricklayers or the stonemasons.

Records prove conclusively the advantages of this type of construction in the matter of rapidity of erection. It has been demonstrated many times that a school building of about 1,500-pupils capacity can be erected and operated as a school within a year from the time of breaking ground. In several cases the period of erection has been reduced to ten months. This reduction in the length of time is highly valuable to the board and to the parents of the children who are waiting enrollment.

The contractor also gains by the use of this type. Assuming that his overhead charges amount to $1,000 per month, his saving would be approximately $10,000, if the time of completion is reduced ten months.

It should be added that all the structural work is not of reinforced concrete, for there are certain conditions, such as auditoriums and long-span structural parts, where it is more economical to use structural steel, columns, trusses, and girders, etc. In connection with sloping roof surfaces and suspended ceilings forming the floor of a plenum heat chamber, it has been found more advantageous to use a gypsum-slab construction.

How Plans are Prepared

All the work connected with the design and execution of the plans is carried on within the department of buildings by the aid of the architectural, structural, mechanical, and inspection departments, all coordinating in the work.

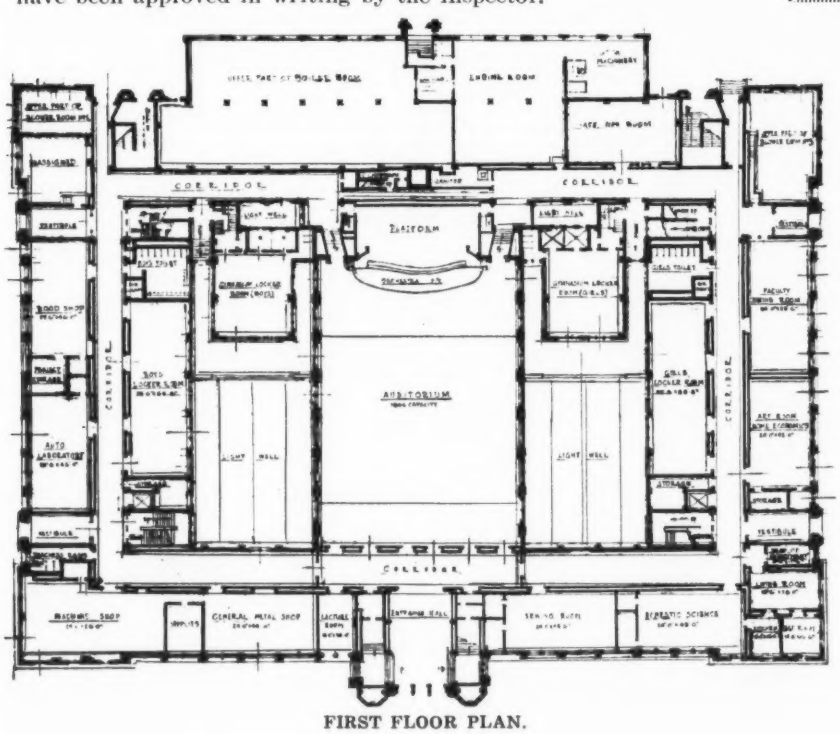
The specifications are all written and issued by a separate department, working in conjunction with all of the other departments, so that there may be no overlapping of work. Before the final issue of any specification, each department goes over and checks the particular part of the work with which it is directly concerned.

This is done by the use of a master specification which notes all conditions entering into former work. Notices of changes or special items to be included in new work are given to the specification writer by the various department heads on special memorandum slips made for the purpose.

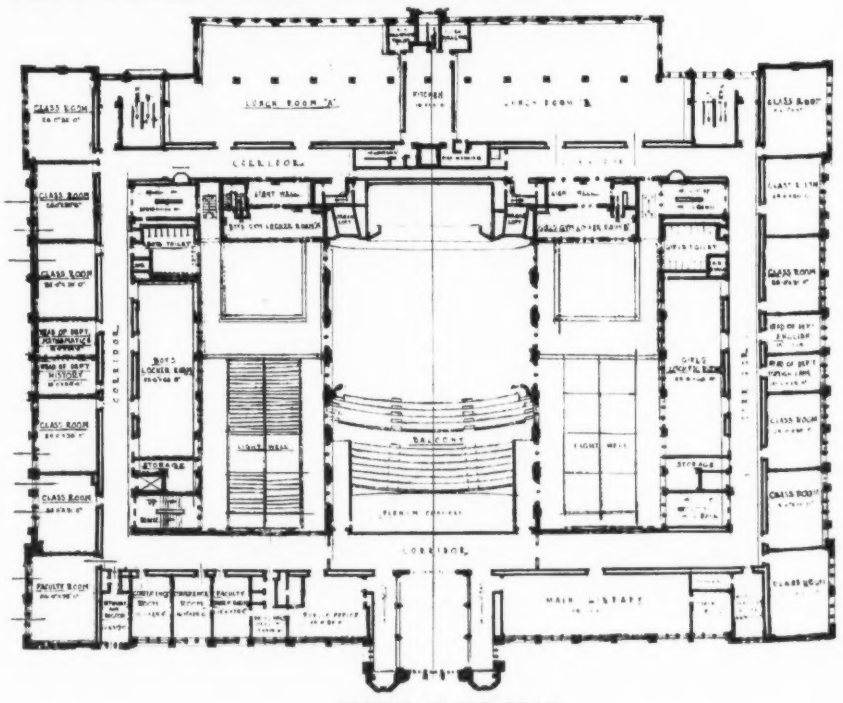
All specifications for new work are printed in the board of education's printshop, and usually make a book of about 300 pages. Samples of materials to be used in new work as called for in the specifications are submitted by the various contractors in duplicate, the actual work not being permitted to proceed until these samples covering the different parts of the work, have been approved in writing by the inspector.

MAIN ENTRANCE.

OVERBROOK SENIOR HIGH SCHOOL, PHILADELPHIA, PA.
Designed by the Board of Public Education, Philadelphia, Pa.



FIRST FLOOR PLAN.

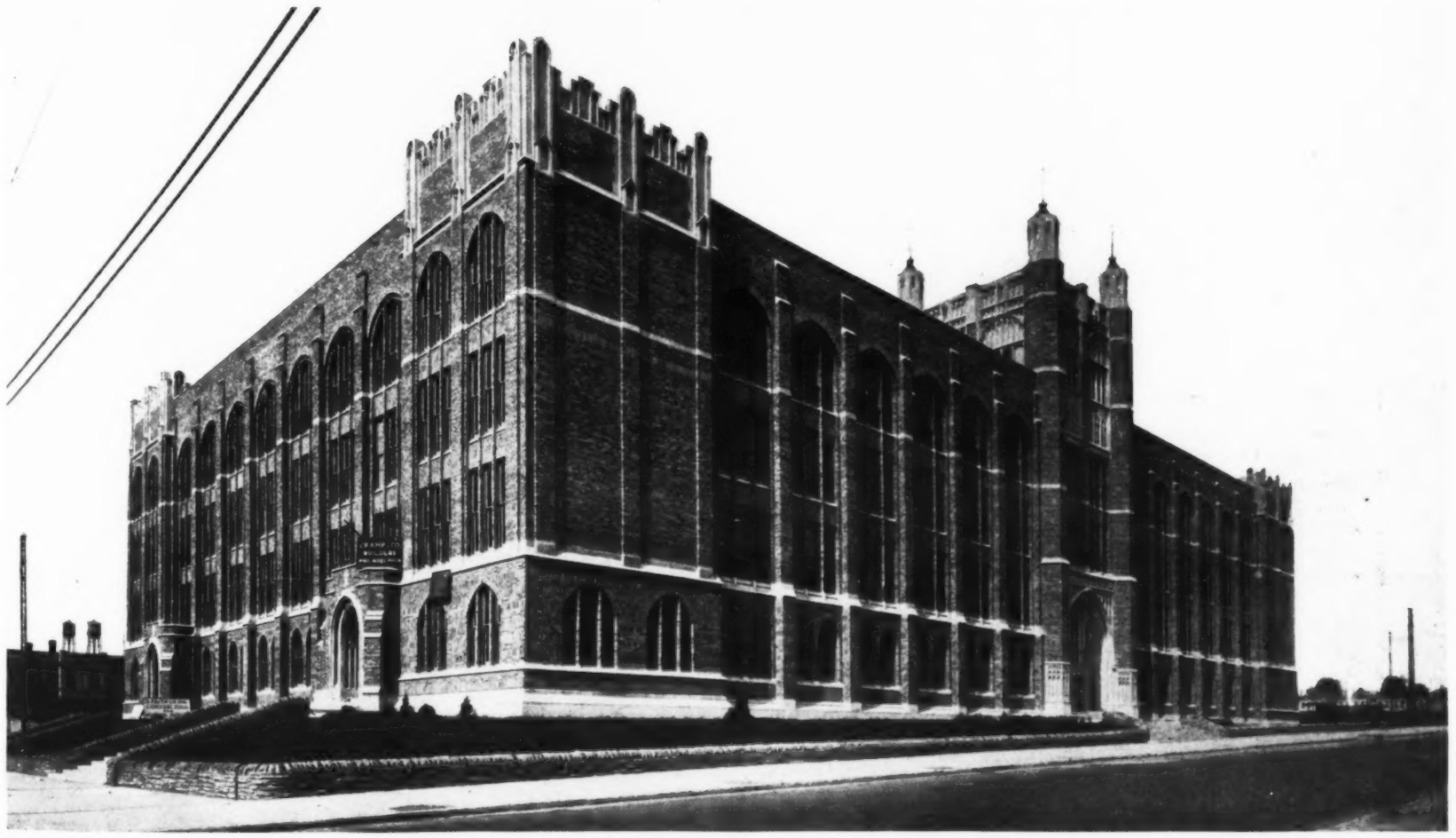


SECOND FLOOR PLAN.

SIMON GRATZ SENIOR HIGH SCHOOL, PHILADELPHIA, PA.

Designed by and erected under the supervision of the Department of Buildings, Philadelphia Board of Public Education.

The Simon Gratz High School in the foreground is a senior high school and accommodates a total of 3,750 pupils. The building in the background is the Elizabeth Gillespie Junior High School and accommodates 1,960 pupils. The buildings are erected of reinforced concrete, brick and stone, and represent the best types of permanent Philadelphia school structures. More than 4,000,000 bricks were used in the two buildings.



WILLIAM T. TILDEN JUNIOR HIGH SCHOOL, PHILADELPHIA, PA.

Designed by and erected under the supervision of the Department of Buildings, Philadelphia Board of Public Education. This building was begun in February, 1926, and completed in April, 1927. The total cost was $1,241,087. It has a pupil capacity of 2,040. The cost was 43.1 cents per cubic foot or $608 per pupil.

NORTH END.

WILSON JUNIOR HIGH SCHOOL AT ERIE

G. O. Moore, Assistant Superintendent of Schools

The Wilson Junior High School, at Erie, Pennsylvania, the contracts for which were let in August, 1925, and the building occupied for school use in September, 1927, is a building designed for the work which is carried on in the seventh, eighth, and ninth grades.

The building, located at 28th and Reed streets, is of the box-shaped, inclosed-court type, two and three stories high as determined by the topography of the site. It has well-lighted corridors extending entirely around the building on each floor. Four main stairways, conveniently located, conjoin the corridors of each floor, forming a continuous line of travel to each department throughout the building.

The building is of fireproof construction. The walls of brick and tile, tile partitions, wood floors in classrooms laid over reinforced concrete slabs; concrete stairs with composition risers and treads; cork-tile floors in corridors with composition base and border; cork-tile floor in the library; composition floor in the auditorium with cork-tile aisles and approaches; tile floors and wainscots in the cafeteria and cookeries; concrete roof slab furred-metal-lath-and-plaster ceiling throughout the second story.

Offices for the administrative work are located adjacent to the main entrance on the first floor and consist of a general office, a principal's office, an assistant principal's office, a vault, a storeroom and a toilet room.

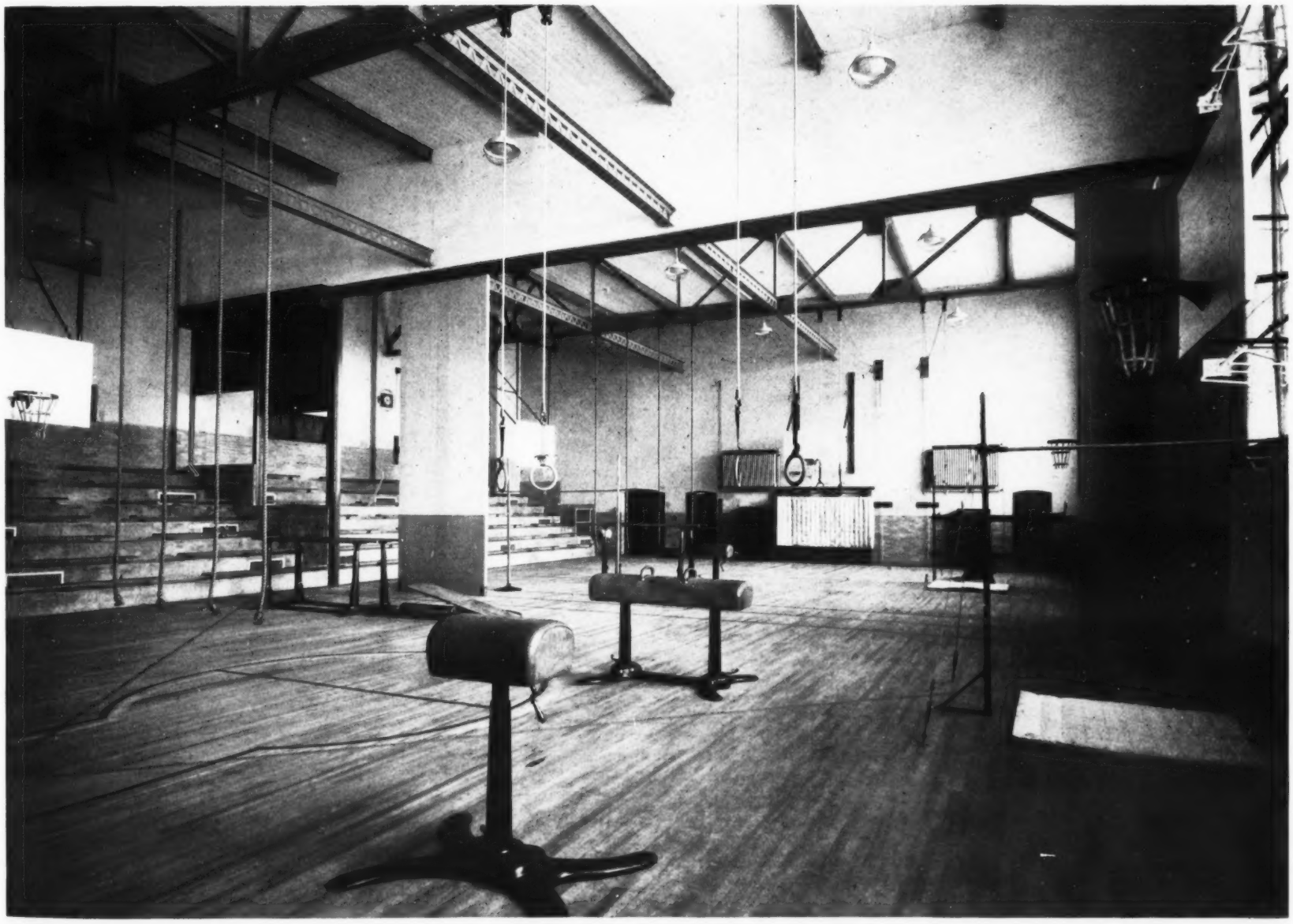
The health room is advantageously situated off the main corridor on the first floor and consists of one large room with a waiting room and a separate toilet room.

On the ground floor there are three general shops, each with a separate storeroom in connection; four classrooms; a cafeteria with capacity of 400; two bicycle rooms of 86 bicycle-capacity each; two large general storerooms; one girls' toilet; one boys' toilet, shop locker and washroom; two janitors' closets conveniently located on each side of the building. In addition, the ground floor contains space for the mechanical apparatus, consisting of boiler room, fanroom, coal storage, transformer room, pumproom, and engineer's room.

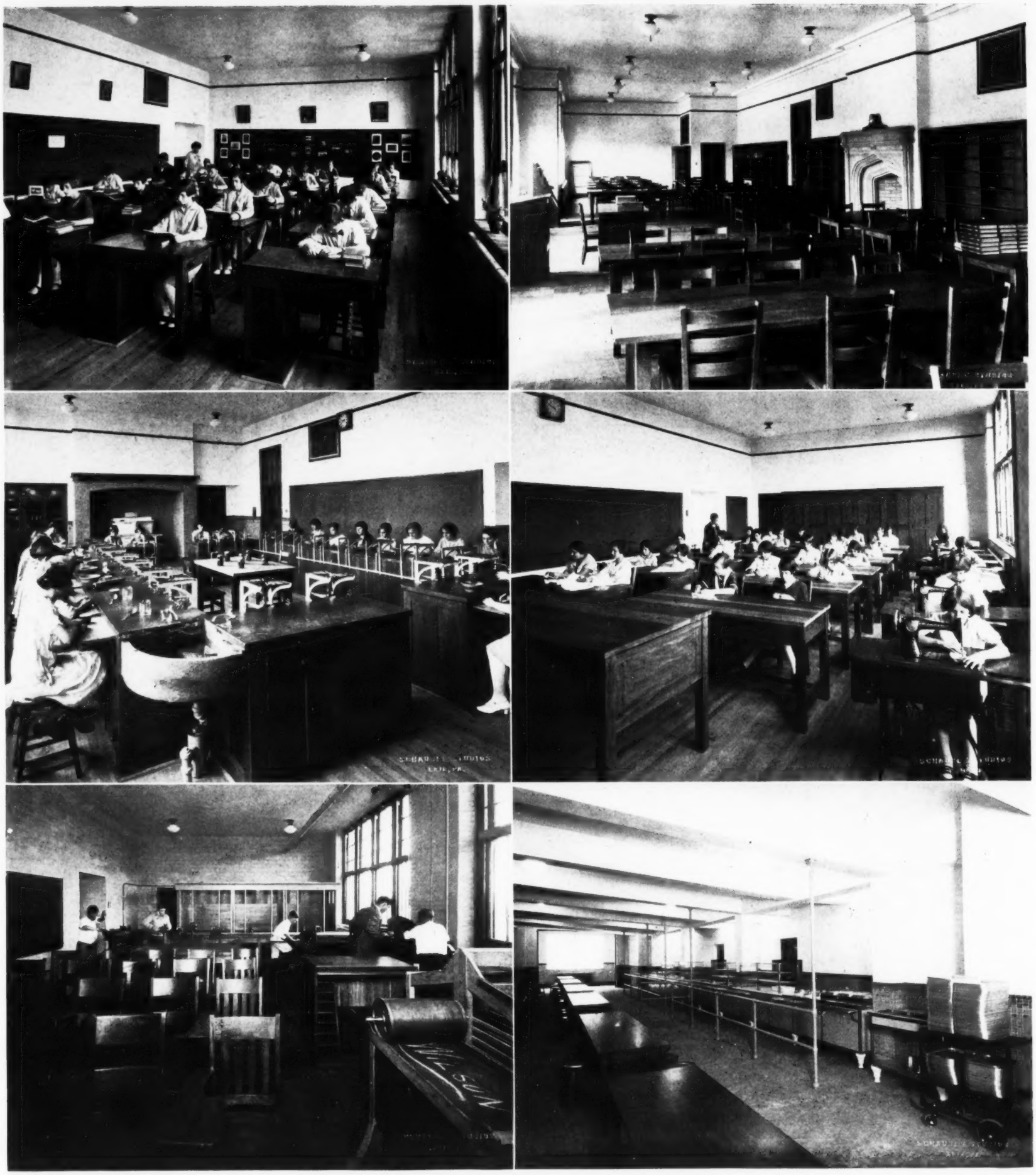
On the first floor there are eleven classrooms; two sewing rooms, two cookery rooms and music room with separate storeroom in connection

DETAIL OF ENTRANCE,
WILSON JUNIOR HIGH SCHOOL, ERIE, PA.
Meyers & Johnson, Architects, Erie, Pa.

WILSON JUNIOR HIGH SCHOOL, ERIE, PA.
Meyers & Johnson, Architects, Erie, Pa.



GYMNASIUM,
WILSON JUNIOR HIGH SCHOOL, ERIE, PA.
Meyers & Johnson, Architects, Erie, Pa.



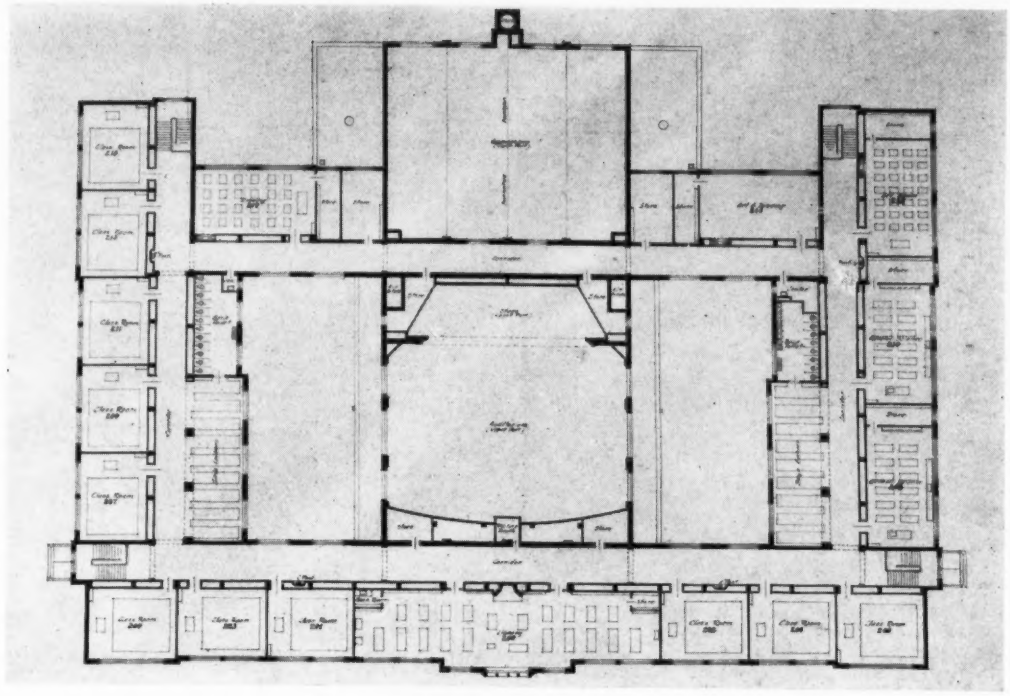
INTERIOR VIEWS OF WILSON JUNIOR HIGH SCHOOL, ERIE, PA.
Meyers & Johnson, Architects, Erie, Pa.
TOP: Art room and Library; CENTER: Cookery and Sewing Rooms; BOTTOM: General Shop and Cafeteria.

with each. The gymnasium, not including spectators' gallery which has seating capacity of 320, is 50 by 80 ft. and arranged with folding partition to make two gymnasiums, each 50 by 40 ft. in size. Adjacent to the gymnasium are rooms for boys' and girls' instructors, girls' locker and showers, and boys' locker and shower rooms. The first floor also contains a restroom for teachers and a restroom for girls with separate toilets for each room; retiring rooms are located adjacent to the offices.

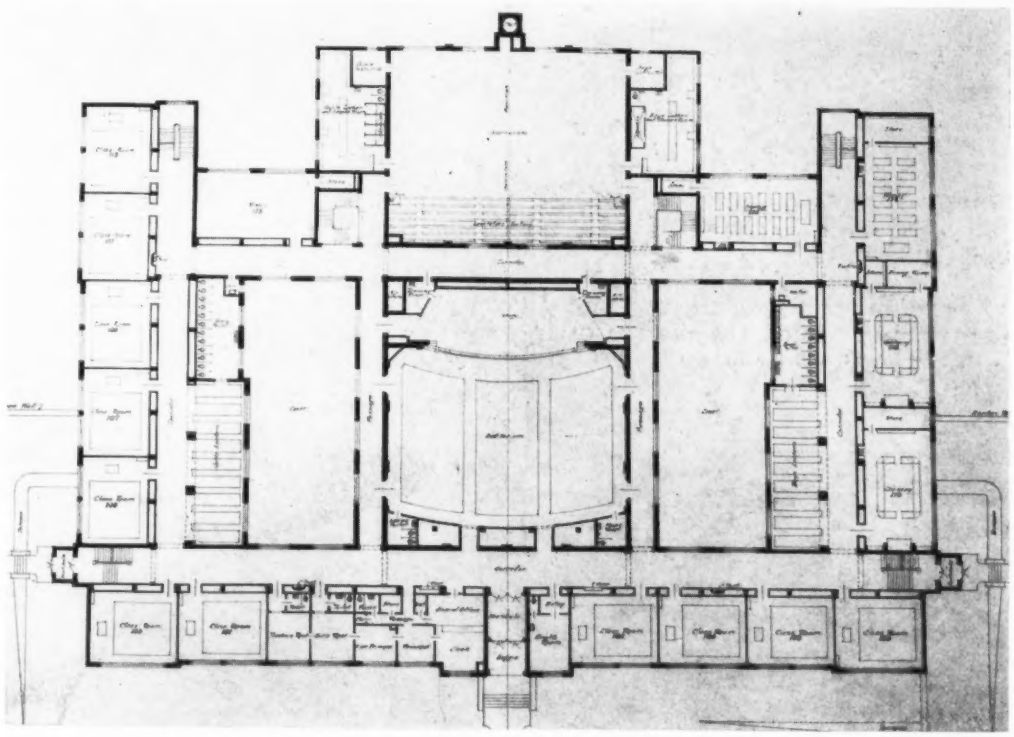
The auditorium which seats 725 is in the center of the building with entrances on a level with the first floor. It is equipped with picture booth, adequate stage, and two dressing rooms. A girls' general toilet room and boys' general toilet room are placed on this floor also. Located conveniently to the corridor are a girls' locker room, with 310 lockers, and boys' locker room of the same size.

The auditorium and gymnasium are each a self-contained unit arranged to serve for community as well as school use, each unit having separate entrances and segregated when desired by means of rolling steel doors located in corridors.

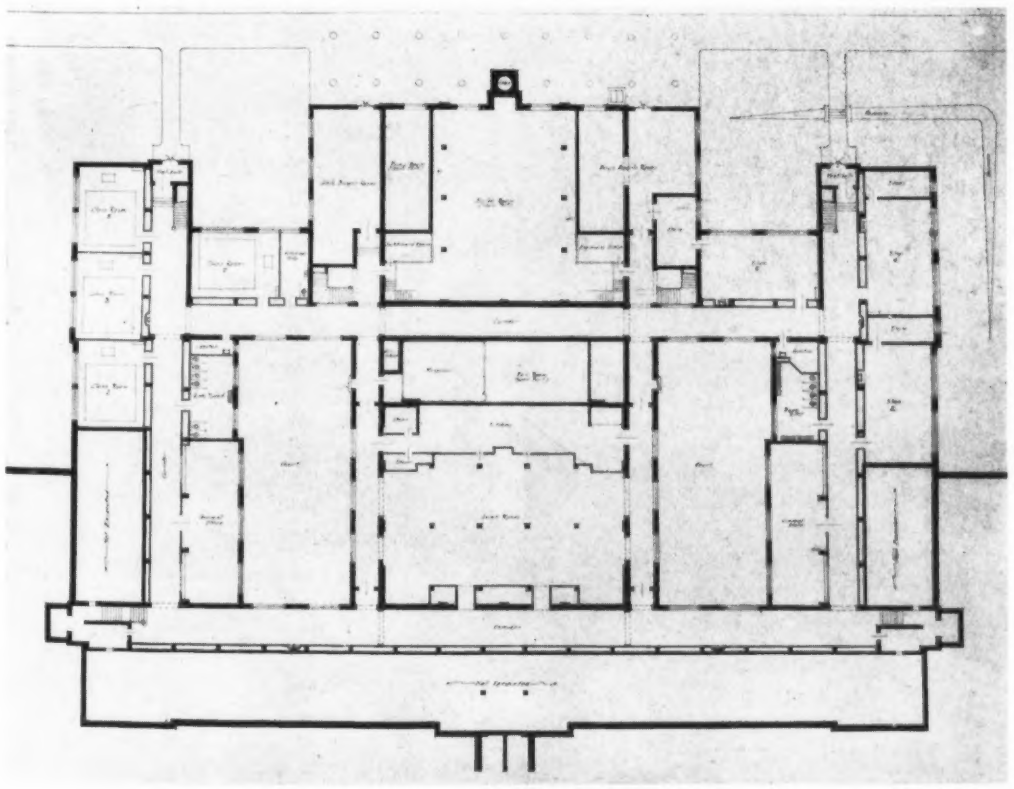
On the second floor at the front of the building, over the offices, is found the library with separate workroom and separate storeroom and book stacks with a capacity of five thousand volumes. We find also eleven classrooms, a drawing room and artroom, and a combined drawing and artroom, and separate storerooms for each. There are also on this floor two laboratories for general science and biology with separate storerooms; toilet rooms; a girls' locker room with 310 lockers and boys' locker room of the same capacity; two janitors' closets and two general storerooms.



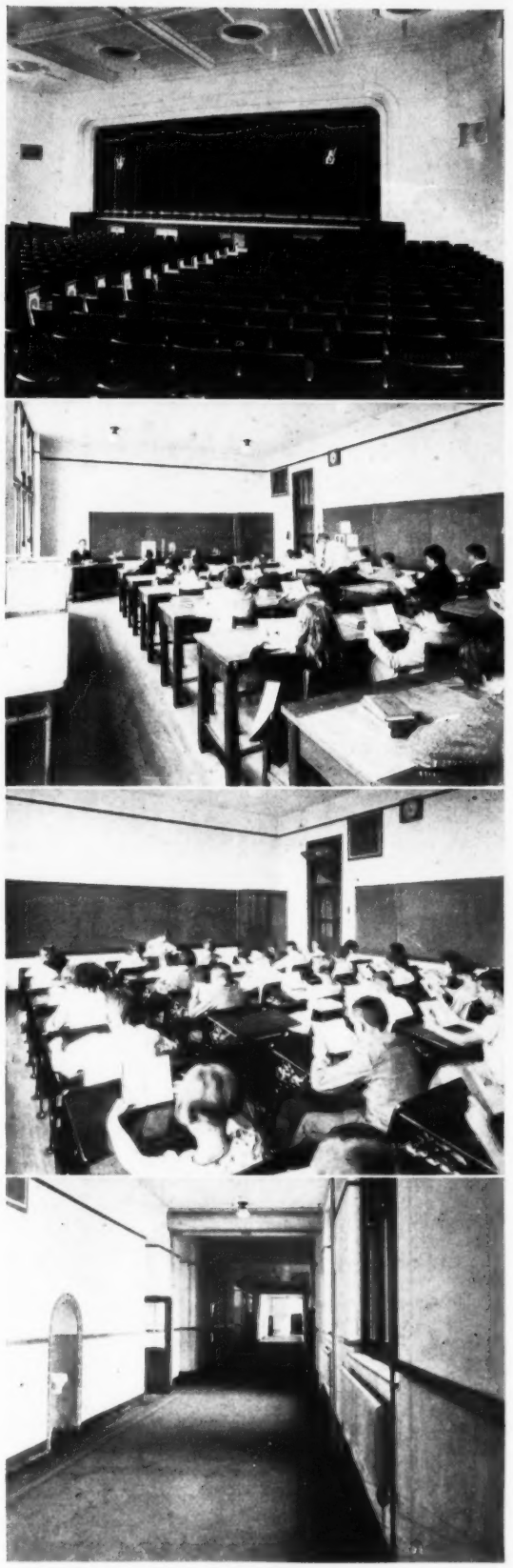
SECOND FLOOR PLAN.



FIRST FLOOR PLAN.



GROUND FLOOR PLAN.



Top to Bottom:
AUDITORIUM, SCIENCE ROOM, A TYPICAL CLASSROOM, AND CORRIDOR.
FLOOR PLANS AND INTERIOR VIEWS OF THE WILSON JUNIOR HIGH SCHOOL, ERIE, PA.
Meyers & Johnson, Architects, Erie, Pa.

The student capacity of the building is 1,394, based upon the capacity of the instructional rooms. The cost of the building including general work, plumbing, heating and ventilating, electric work, clocks, bells, and telephones is $654,052.00. The number of cubic feet in the building is 2,200,000, and the cost per cubic foot is 29.7 cents.

The complete equipment, including metal lockers, lighting fixtures, pupils' desks and chairs, opera chairs, teachers' desks and chairs, window shades, stage curtain and stage equipment, auditorium window draperies, cafeteria, kitchen and lunchroom equipment, sectionfold partition in gymnasium and rolling steel doors in corridors cost $53,000.

The space allotted to the various activities was proportioned to suit the number of pupils

(Concluded on Page 174)

GARDENA ELEMENTARY SCHOOL, LOS ANGELES, CALIF.
Designed by the Business Department, Los Angeles Board of Education.

DETAILS OF GARDENA ELEMENTARY SCHOOL, LOS ANGELES, CALIF.

How Los Angeles Builds Schools

O. H. Barnhill

During the past three years the Los Angeles school district has spent approximately $34,000,000 for school sites and new buildings. In completing this building program, a high record for new school construction has been established. There also has been expended a greater sum of money for extensions and improvements than any other city in the United States has spent during a similar period.

Some idea of the vastness of this building program can be obtained from the fact that during this three-year period about 50 new school sites have been purchased, plans and specifications for new buildings prepared and edifices erected upon these sites, together with hundreds of additions and improvements to existing plants.

During the fiscal year ending July, 1927, there were completed building operations for 78 elementary schools, 17 junior high schools, and 17 senior high schools. During most of the three-year period there have been in the course of simultaneous construction from 40 to 110 building operations. In some months as many as 20 buildings have been completed and accepted by the Los Angeles board of education.

The cost of building construction for this three-year program has been approximately $22,000,000. Cost of sites purchased, $12,000,000.

New Building Program

In spite of this unprecedented building program, apparently there is no intention on the part of the board of education to halt school work. The continued growth of the school district will require continuous expansion of the school-building program. The yearly increase in school enrollment was from 13,000 to 30,000 during the past three years. The enrollment for the current year indicates an increase of 18,000 pupils over last year.

Los Angeles even now is planning further school expansion. Another bond issue, for the purpose of securing more money to construct and equip additional schools, is being considered. The business department is preparing an estimate of future needs, which will be referred to the board of education.

The enormous territory covered by the Los Angeles school districts greatly complicates the problem of providing adequate educational facilities. Although the area of the city is 450 square miles, the elementary-school district covers 750 square miles and the high-school district 1,100 square miles. The latter includes a tract of land approximately 40 miles long and 30 miles wide, stretching from the San Gabriel valley to the Pacific Ocean and including most of the San Fernando valley and the Santa Monica hills.

Vast Area Covered

The difference in the area covered by the two districts made it necessary to divide the proceeds of the last bond issue into two funds: $19,360,000 for the high schools and $15,280,000 for the elementary schools. What seems like an unduly large share for the high schools was made necessary by the inclusion of the junior high schools, which take care of the seventh and eighth grades, commonly classed as elementary.

Because of the great size of the school district, much of which is sparsely settled, more schools in proportion to the population are required than in a community more densely settled. In some sections the only way to solve the transportation problem has been to build more schools.

Schools had to be provided for large communities where a few years before there was only vacant land. One school which opened with 100 children increased to 1,668 in less than two years, rendering quick action in providing additional buildings imperative. Other similar instance could be cited.

In addition to unprecedented volume, the method of building Los Angeles schools devised by William E. Record, business manager of the board of education, has established another record for efficiency. All of the vast quantity of construction work carried out during the building campaign now closing, and others of similar magnitude, have been under the personal direction of the business manager and his corps of division superintendents.

This plan insures standardized construction at minimum expense. The average cost of buildings erected during the past three years has been approximately 20 cents per cubic foot, counting from the foundation base to the average roof height.

System of Supervision

One of the most important features of the Los Angeles building plan is the method of supervising construction work. Instead of having this done by a private architect at a cost of 2 per cent, it is executed by the business department's building superintendent at an avrage expense of 1 per cent. This represents a saving on the present $22,000,000 building program of $220,000—enough money to pay for three new buildings.

The greatest advantage of this method, however, is the gain in efficiency. Because of the immense volume of construction work under its supervision, the business department can afford to employ experts in all lines of construction—concrete, stone, brick, wood, painting, plumbing, heating, ventilating, and electrical work.

These experts also serve in the maintenance department, directing necessary repairs and operation of the various school plants. The inspectors go from one building job to another, keeping close watch on the work being done. A concrete specialist stays on the job while the wells are being poured, the painter while the building is being painted, and so on with other lines of work.

The school territory is divided into two districts, each of which is under a supervisor, whose activities are directed by the building superintendent. There are about 30 subinspectors, who report each day on printed forms the progress and condition of construction they have inspected. These reports are mailed each evening by special delivery and must reach the business office not later than noon the following day.

In addition, daily telephone reports are made by each inspector. This system enables the business department to keep in constant touch with all construction work, no matter how many buildings are being erected at one time. Written reports are filed away for future reference.

Handling Plan Changes

Any changes or discrepancies noted in construction are referred to the school architect, who at once investigates and has the error corrected. This is an obvious improvement on the usual plan of waiting until a building is completed before the owner learns of alterations, substitutions, or inferior workmanship, when often it is too late to remedy the mistake.

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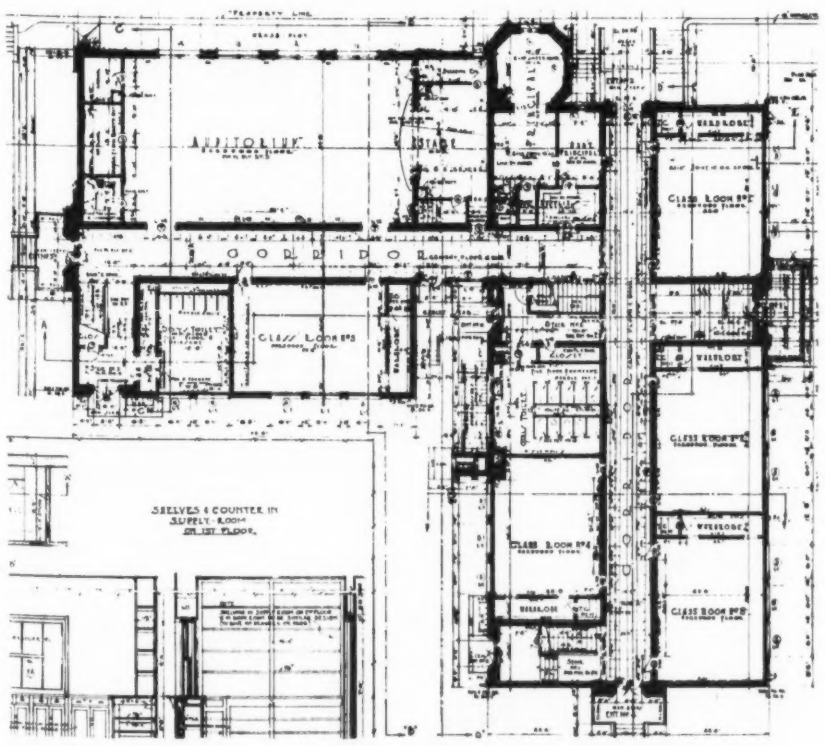
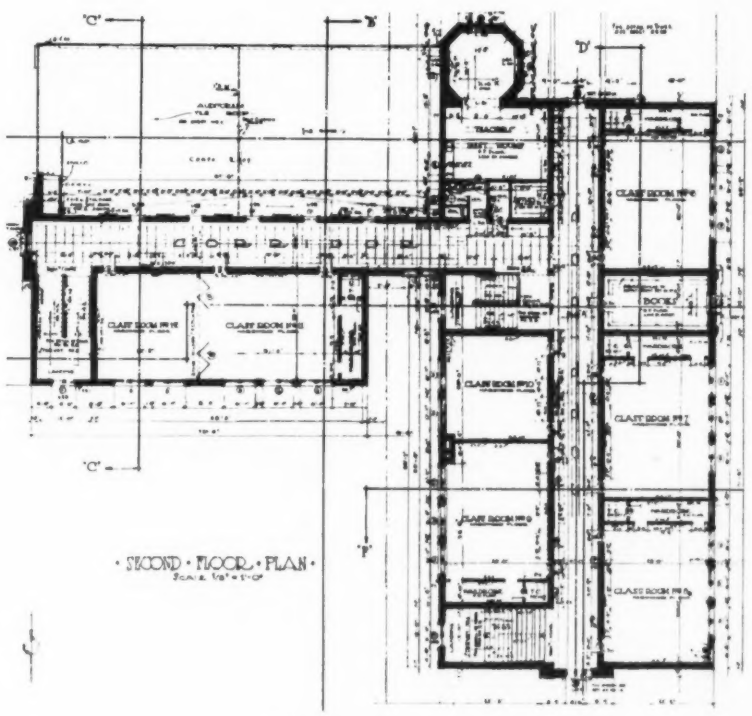


FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

GARDENA ELEMENTARY SCHOOL, LOS ANGELES, CALIF.

The High-School Library

Principal William C. Giese, Racine, Wis.

"Readin', ritin' and rithmetic" were in the good old days taught largely without the aid of any equipment other than a textbook. The hickory stick was held in high esteem as an instrument of educational persuasion, and learning which was especially hard was regarded as especially good. The little red schoolhouse, the "bulwark of the nation,"—given over to lesson hearing and lesson learning—was barren of instructional aids. Sometimes a gifted teacher in whom were combined scholar, philosopher, and leader of youth, established a fruitful oasis in the educational desert, but in the main the little red schoolhouse was a dreary place.

Today the school curriculum is founded on the belief that children learn by doing, and that learning will be more rapid and lasting if it is achieved with pleasure and satisfaction. Teachers strive to make the work of the classroom, not a program of lesson hearing, but a program of activities. The average teacher needs assistance in the difficult business of helping youth to educate itself. In response to this need, the equipment of our schools has expanded so that our classrooms are becoming laboratories, each reflecting in its atmosphere and equipment the nature of the subject studied. The central agency which serves all teachers and all departments is the high-school library. Here the student with a problem can be sent, whether he comes from the English class or from the shops; here the teacher finds the material for individualizing instruction, for special projects, and for enriching the bare outlines of the text; here is found helpful material for all the activities of the school whether these arise in the classroom or outside of it. In fact, in the modern high school with its diverse programs and interests, the library is a motivating force and unifying agency.

The Center of Activities

Because this change in our conception of education referred to above has made the library the center of the school's educational activities, it should follow that in planning and equipping our schools the library should receive first consideration; yet it often occupies such cramped and inaccessible quarters that the effect is presented of having been smuggled in against the wishes of the architect and school administration. It is difficult to understand why this should be the case. Other departments, in the enlarged space and ample equipment provided for them, reflect a general acceptance of the new conception of teaching and learning; but the library which should play the largest part in the new program of education, has been overlooked and neglected. That the condition is general and not exceptional is indicated by the reports of two committees of the National Education Association, which were appointed to make a study of the high-school library equipment in the United States. The preface to the report of the first committee reads in part as follows:

"In the building of high schools in the past 25 years it has been the custom to provide adequately, or approximately so, for science and a little less generously for household arts and manual arts. But in planning our high schools we have overlooked with very few exceptions, the high-school library. . . . There are few well-planned high-school libraries in the United States. . . . We have been able to take boards of education to neighboring cities and show them what has been done, but we have been unable to do that in the library field."[1]

This report was made in 1918. Four years later a second committee on library problems made a report. Evidently the intervening time had not brought much improvement, for this committee says:

"School architects have been left entirely to their own devices in library design, while pressure all the while has been brought to bear upon them by persons interested in other lines of schoolhouse construction. Consequently, the provisions made for the housing of school libraries have been most inadequate for modern educational needs. In fact, in many of them it is utterly impossible to teach in accordance with present-day educational and industrial requirements because of the handicap of poorly constructed libraries."[2]

Library Standards Available

May not the inference be drawn from this report that the library has lacked an earnest and intelligent advocate in the councils devoted to school planning? It is evident that the larger and more spectacular phases of schoolhouse construction, the gymnasiums, the swimming pools, the shops, and the auditoriums have been able to push their claims with considerable success, and that the library whose function is not spectacular but, nevertheless, far-reaching in importance has been forced into the background.

An example of this is found in a high school recently constructed in the middle west, which has a $50,000 swimming pool and a $15,000 library. Obviously, it ought to be somebody's business and somebody's responsibility to preserve a proper balance and proportion in the expenditures for the various departments of the school.

It is true that the literature on schoolhouse construction and planning published prior to 1918 had little to say about the school library. This may account for the fact that school administrators and school boards failed to make adequate plans for it in their school buildings. Since that time, however, the National Education Association, the American Library Association, and a number of other authorities have formulated comprehensive standards, setting forth the requirements which should be met in library design. An exhaustive treatise on school architecture, published in 1921, sets forth the importance of the library in these words:

"The school library, in the importance of its relation to the whole school plant, is second to no other department. Indeed, the time is not far distant when it will serve the needs of the secondary school and the community as the college library serves the needs of the university. Like the school it has not yet been fully discovered. . . . The school library so functions with the school organization that if it is inadequate in size and equipment, or poorly located and administered, the educational efficiency of the school as a whole is greatly impaired. On the other hand, an adequate well-conducted library may offset a number of deficiencies in other departments. The library is of such importance to the school plant that it might be stated as an educational axiom that the prospective value of the student to the state, society in general, and to himself, is largely dependent upon his regard for the library and his ability to make the fullest possible intelligent use of it."[3]

The Architect's Part

Is this overstating the case? If the reports and recommendations of the several committees of the N. E. A. who have studied the library in its relation to secondary education are worth anything as evidence, the statement is moderate enough. The present-day program of education in the high school must center around the library. To neglect to make adequate provision for the library places upon teaching an almost insurmountable handicap. Those responsible for the administration of education, for the planning and construction of school buildings, should demand of the architect a treatment of the library which is commensurate with its importance in our educational program. School architects are specialists in design; they are rarely also specialists in education. It should be the business of the high-school principal, the superintendent, and the board of education to know what sort of a school plant the modern high school needs; it should be the business of the architect to design it in accordance with their requirements. The general lack of proper library facilities in our high schools is evidence of lack of foresight and vision on the part of school administrators.

What, then, are the requirements which good library design should attempt to meet? The recent studies are remarkable for their agreement on the following standards:

Minimum Essentials

I. *Location of Library*
- *a*) Central for all departments of the school.
- *b*) Adjacent to or connected with the study halls.
- *c*) Second-floor location preferred.

II. *Units in library group*
- *a*) Reading room large enough to accommodate 10 per cent of the enrollment of the school.
- *b*) Librarian's office and workroom.
- *c*) Library classroom.
- *d*) Two or more conference rooms.

III. *Lighting*
- *a*) Windows on three sides.
- *b*) Ceiling lights for artificial lighting.

IV. *Equipment*
- *a*) Tables 3 by 5 ft. for reading room.
- *b*) Bookshelves against walls preferred to book stacks.
- *c*) Chairs without arms but with bookracks under seats.

V. *Decoration*
- *a*) Finish should be in the lighter shades.
- *b*) Pictures and other works of art.

A competent school architect can meet all of these requirements, if he understands that the school administration will not be satisfied with anything less. Instead of following the usual practice of allotting to the library the combined space of two classrooms—a poor makeshift at best for any but the small schools—good school planning should provide for the library first, and then design the other instructional units with reference to it. This will make it possible to give the library group a central location easily accessible from all parts of the building. If the library is also to be used as a community library outside of school hours, it must be so located that the public will have ready access to it and yet will be shut out of other parts of the building. This will demand a location on the first floor.

The Racine Library

The accompanying sketch shows how the requirements listed above were met in the design of a senior high school for the city of Racine, Wisconsin. The school has a capacity of about 1200 pupils. The central or main section of the building, houses the academic departments. In the left wing are the gymnasiums, and in the right wing the auditorium, the cafeteria, the shops, and the household-arts laboratories. The library is placed in a small central wing which has a ceiling height of two stories. The superior features of the plan may be briefly summarized as follows:

1. Since the library adjoins the study halls, it is unnecessary for students to make out pass slips when they go from the study hall to the library.

2. The academic departments, which make the greatest use of the library, are nearest to it; on the other hand, the shops, the music room,

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[1]National Education Association, Report of Committee on Library Organization and Equipment, 1918. Department of Secondary Education.

[2]National Education Association, Report of Committee on Library Problems. Proceedings, 1922, p. 1280.

[3]Donovan, John J., *School Architecture.*

The Cost-Plus System of Letting Contracts for Schools

Warren S. Holmes, of the Firm of Warren Holmes-Powers Company, Architects, Lansing, Mich.

For some years approximately 25 per cent of our school buildings have been contracted for on a percentage or fixed-fee basis, and the balance has been built under fixed-sum contracts guaranteed by surety bonds. The reasons for adopting the first procedure on certain buildings and the latter on others are very important and clearly defined.

There are times of the year when the buildings under construction for most contractors are being finished, and few plans are coming out for figures. Contractors will then often take jobs at practically cost, just to keep busy and to carry overhead. There are other times when the majority of contractors have a good job or two just under way, and more plans for new jobs than they can possibly figure are available. At such periods they make their figures consistently high, adding an increased percentage of profit and figuring higher on both labor and materials. This condition presents a serious problem to the architect who has made an estimate and drawn plans and specifications for a building, on the basis of average costs plus the usual contractor's fee. Obviously, if he is to let a contract under these conditions, he must look farther than his bids.

The Economies Involved

In such an event, a logical procedure for the architect is to consult one or more contractors for suggestions to reduce the cost without sacrificing the quality of the building. The contractor proposes a fixed fee or percentage plan in which the following savings can be made:

1. The surety bond of 1½ per cent.

2. The financing costs. Since the school district's money can be used, the contractor need not temporarily invest from 10 to 15 per cent of building costs, which he often has to borrow at the bank.

3. The opportunity of saving the amount allowed in the estimate for contingencies (an appreciable amount in the estimate of a contractor of experience).

4. A practically sure opportunity to save a substantial sum on sub-bids.

5. An opportunity to make some changes or omissions if necessary, before completion, to keep within the appropriation.

6. The savings of from 2 to 5 per cent in contractor's fee, by reason of the contractor's willingness to work on a closer assured margin under this form of contract.

7. A chance to substitute some lower-price materials which may become available in the current markets.

If the contractor is known to be efficient, reliable and honest, this is a legitimate way out. However, it must be clearly borne in mind that the architect and owner virtually and morally, if not legally, become jointly responsible with the contractor for the successful completion of the building within the appropriation. Where the architect, the contractor and the board of education are men of business ability and deserved confidence, this form of contract is the ideal way to build, for the interests of all are identical. All suspicion of the contractor's motives to save costs by substitutions in materials and workmanship are allayed, and his legitimate interests in making savings are properly understood and appreciated by the architect and the owner.

A further advantage of this type of contract often results by reason of the increased interest on the part of the superintendent and board of education in the details of the building, because of their increased responsibility in the building oprations. Frequently changes are adopted, resulting in improvements in the building, that would have had little consideration under the contract plan.

The Best Method for Remodeling

We have been especially successful with this form of contract when remodeling is involved. Invariably contractors do not know how to figure a job involving extensive remodeling. It is often impossible for the architect to know or to properly describe the exact limits of the work involved. Sometimes he can do little more than show the results sought, and let the contractor devise his own methods to guide him in making his estimates. Obviously the only way to be sure of getting value received to both contractor and school district is the cost-plus plan.

The experience in erecting the new high school at Albion, Michigan, is a typical illustration of the advantages of the plan under discussion. The new building is being erected on the site of the old building, part of which was wrecked and part remodeled. Building operations have been carried on in such a manner as to permit the use of a part of the old structure while section A of the new building was in progress. Section A is in use while sections B and C are being remodeled and rebuilt. Bids taken on sections A, B, and C showed that contractors were making practically no allowance for salvage on sections B and C, for which the plans anticipated using much of the walls, foundations, and excavations.

A contract was, therefore, entered into for executing the general contract of section A on a fixed-fee basis and guaranteed maximum price. This contract also named an extra fee for erecting sections B and C, optional with the board of education, which was later accepted.

Section A was completed as per original plans and specifications for $12,000, or 10 per cent less than the lowest bid received, and the savings contemplated in the plans are being realized in sections B and C. The contractor is accepting a fee for his services, amounting to less than one third of the amount added in his fixed-sum bid, for profit and contingencies. While the contractor gives no guarantee of cost in sections B and C, the work has progressed far enough to show that it will be completed well within the appropriation and far below the lowest bids received.

Efficiency of Contractor Essential

It is a well-known fact that a certain class of contractors make money by doing good work efficiently; a certain other class make money principally by reason of what they "get by with"; and there are all degrees of contractors between these two extremes. As a matter of fact, a good contractor can do good work cheaper than an inferior contractor. It is just as practical to get sap out of a dry log as to get good work out of a contractor who is slipshod in his methods and employs any but first-class mechanics.

Boards of education who have had experiences with other than first-class contractors and the resultant high cost of up-keep of their building, often prefer to choose their contractors and to take a chance of slightly higher building costs rather than get inferior contractors by the method of competitive bids.

These, in brief, are the outstanding reasons and advantages of the percentage plan.

Those considering the percentage plan should clearly bear in mind that it increases the work and responsibility of the architect and the board of education, for which they receive no additional pay and usually no credit. Among these responsibilities, if the surety bond is omitted, is that of seeing that the money paid to the contractor is used to pay for labor and materials on the particular job and that sufficient funds be released to take all discounts without making overpayment. There is also

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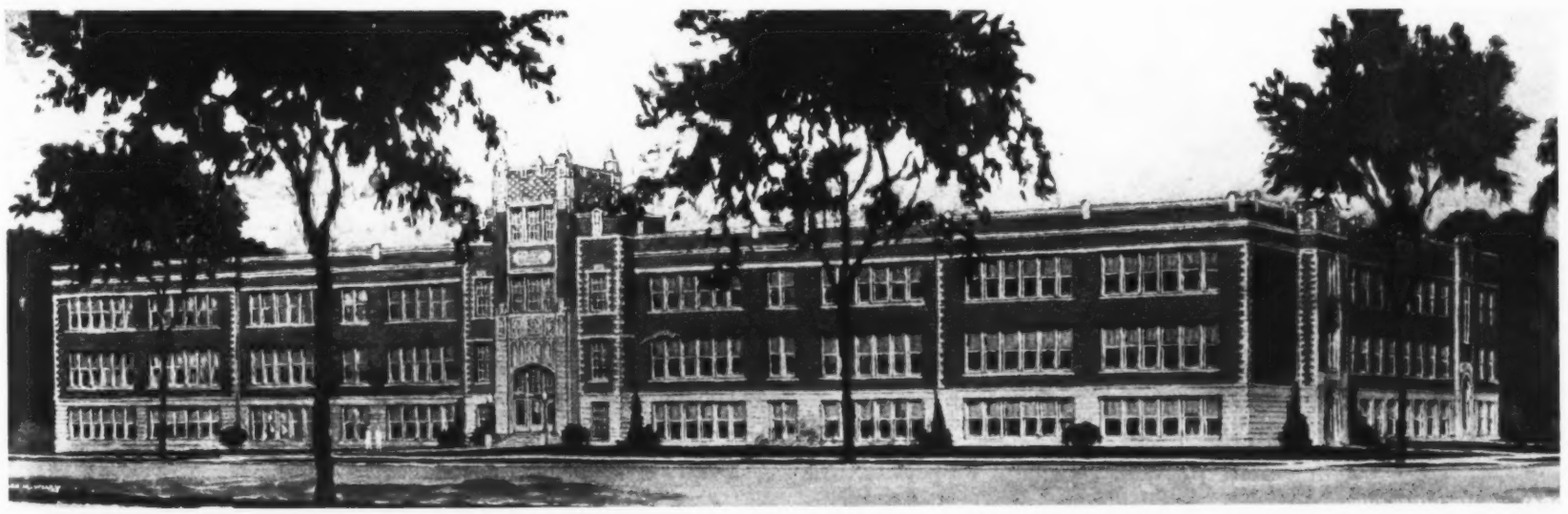


WASHINGTON GARDNER HIGH SCHOOL,
ALBION, MICH.

Warren Holmes-Powers Co., Architects,
Lansing, Mich.

What Teachers Want in School Buildings[1]

J. E. Fearon

For this investigation a group of ten high schools was selected, and visits were made to each for observation and personal conferences with the teachers. From these personal conferences and from the 56 replies to questionaries left with each of the teachers visited, the following summary was made of the outstanding items of teacher opinions, teacher suggestions, and teacher criticisms.

Provision for Supplies. The buildings where the teachers seemed best equipped for the keeping of supplies were those with the H-shaped ventilating piers built into the corridor walls, leaving abundant space all along the inside classroom walls for built-in bookcases, cupboards, magazine racks, dustproof cabinets, and filing and storage cases suited to the needs of the respective departments. However, there seemed to be better planning in some of the buildings than in others. For example, one science department was splendidly equipped with dustproof glass cases for instruments, long narrow drawers for rods, narrow shelves for bottles, etc., while in another school a science teacher complained that there was plenty of drawer and cupboard space but that it did not fit the equipment. He had to go to the basement to find a storeroom for his charts, and was using his own personal filing case in preference to the built-in drawers and cases which did not suit the material he was using. Another science teacher criticized the lack of suitable space for storing equipment, gradually added on—especially for the larger pieces of physics apparatus, which had to be left standing out on the laboratory tables. In one school each department had, besides the bookcases, a small built-in magazine rack, but one teacher suggested that instead of the deep narrow box-like holder, slats would have been just as satisfactory, and much more easily cleaned.

Filing Cases Needed

The English and art teachers were especially anxious for good filing cases, some preferring drawers with index cards, and some the narrow filing shelves. Where the filing shelves were close together, whether horizontally or vertically, the suggestion was made that the boards be removable to allow for proper cleaning. One biology teacher needed a filing case made especially for the uniform size of government bulletins that were kept for reference. The commercial teachers preferred not so much cupboard space, but desks with large suitable drawers for their bookkeeping equipment. One recommendation from the home-economics department for the sewing classes, was a case of 24 drawers behind one door, and under one key in the hands of the teacher. These drawers when in use were inserted in the drawer space of the sewing tables. Large property wardrobes used in dramatics, were features of one school, the wardrobes here being located along one side of the dressing room behind the stage. On the whole there was a decided response from the teachers as to the need for suitable places for the storing of equipment and supplies—cases, drawers, filing cabinets, or storerooms—according to the needs of the particular department.

Seats and Desks. There seemed to be a decided preference among the teachers for the individual seats and desks instead of the tablet arm chairs. The mathematics and English departments were especially strong in their preference, and the commercial and art departments naturally needed tables for their type of work. In a few instances the teachers suggested a preference for tablet arm chairs with the heavy immovable base or pedestal. The movable combination chair desks were liked in the junior high schools. These can easily be swung around by the pupils to face different directions, making for flexibility in the arrangement of the class, and facilitating the cleaning of the floors.

Tables and Desks for Study Purposes

Tables for two students were being used for classes in several of the buildings, but where any individual classwork was to be done, the teachers seemed to prefer the individual desks. The tablet arm chairs seemed satisfactory for a laboratory classroom group where the class could come together in the front part of the laboratory for discussion or demonstration work. For study halls the teachers on the whole preferred the individual seats and desks.

In many cases the library-study-hall plan is being used successfully, but if the tables are too narrow or too crowded, as one teacher expressed it, "the children's feet get mixed up easily," and the problem of discipline becomes harder. There seemed to be very little need for drawer space or box inclosure in the desks, unless perhaps in the homerooms. Most of the schools have individual lockers with bookshelt space and so in most cases the individual desk drawers were empty.

Bulletin Boards. In one of the newer schools visited, it seemed that the bulletin boards were being used more than the blackboards. Practically all of the teachers, they said, even in the mathematics department, preferred large bulletin and less blackboard space. The tacking strip above the blackboard was generally approved of, especially for artwork or exhibits with large figures. For printed material, writing or anything to be examined in detail, it was not considered so practical. One teacher suggested a beaverboard glass-covered bulletin board for the swimming pool.

Interesting exhibit cases were found in several of the buildings in the halls, recessed in the walls and with glass doors, at times with special lighting devices. In one building one glass had just been smashed in, which led to the suggestion that two or three horizontal bars be put across the lower part for protection. Glass-covered tables were mentioned for exhibits, especially for library work.

Blackboards. It was suggested that on the whole, blackboards be made narrower, since so often the top and bottom are used only by awkward reaching. A front double sliding blackboard was one of the suggestions, as useful for test questions and work that could be raised to within the view of everyone. This would be particularly valuable for the larger classrooms. A large number of teachers expressed a desire for screens over the chalk tills, also the need for vacuum cleaners for the erasers.

The Locker Problem

Lockers. The individual student locker seems to have been adopted universally in the newer buildings; the recessed lockers on the whole were approved more often than those projecting out into the halls. One teacher expressed a desire for some kind of noiseless lockers. Wardrobes for high-school students seemed most unsatisfactory in the schools where they were used, the teachers reporting a good deal of petty stealing from the wardrobe rooms. In many buildings each teacher's room had small built-in wardrobes for personal use, that seemed to be very practical and much appreciated. The physical-education teachers felt that the ordinary lockers in the gymnasiums were too small, no provision being made for street clothes. However, one teacher showed with pride the system used in his building in which each dressing room contained a long large-sized locker and six small ones—one for each class. When changing to the uniform, the street clothes could be kept in the large locker, the girl using her own padlock from the smaller locker to lock the larger one.

Doors. It was practically the unanimous opinion that there should be glass panels in the classroom doors, and most of the teachers preferred the clear glass to the ground glass. One teacher in a school where the doors were all wood recommended teaching with open doors, as providing more light for the halls, better cross ventilation, and better hall discipline, since the students knew the doors were always left open. A special teacher recommended doors with metal frames for the shower rooms and swimming pool. Noiseless swinging doors were preferred for the library.

Walls and Floors

Walls. It seemed to be the general opinion that the lower part of classroom walls should be dark colored or made of paneled wood or oiled canvas, and that the upper part should be light colored. One teacher would have the upper walls artistically tinted, believing that this would relieve the depression likely to result from much dark blackboard space and would make for more cheerfulness. Instructors in science rooms and places where the stereopticon or reflectoscope are used, prefer a white front wall space if possible, to be used in place of a separate curtain. The physical-education teacher would have glazed brick for the gymnasium walls. A few believed removable partitions to enlarge certain rooms would be desirable, and another group thought that such partitions would be unsatisfactory. Only one example of this kind was found in connection with the classrooms, and that was in an elementary department where the two opposite primary rooms and the corridor could be thrown together into one large social room. One new high-school building not yet completed was making plans for moving voting booths which at election time were to be the real voting center for the community. In one school there was a folding iron-grating partition which could be extended out across the side halls as a cut-off when the main auditorium or gymnasium was to be used for some public occasion.

Floors. The practice of oiling hardwood floors seemed to be most generally followed. Five out of 26 teachers considered oiling unsatisfactory, one complaint being that they became slippery when wet. Battleship linoleum was preferred in the newer buildings especially for the library and halls. One teacher criticized the smooth tile floor of the school hallway as being too slippery for the children to walk on. In one or two cases, where a paint was used on the cement, the complaint was made that the paint kept flaking off from the cement. A majority of the teachers expressed themselves in favor of a sloping floor for the auditorium. When the auditorium is furnished with movable chairs, so that it can also be used for social occasions, naturally a level floor was held to be the most desirable kind.

Lighting Preferences

Lighting. The vote was 35 to 12 in favor of the unilateral as compared to the bilateral or trilateral lighting system. A number still favor the bilateral lighting as being more cheerful and friendly, and better for window ventilation in mild weather. The double window shades are widely used, only a few teachers reporting them as unsatisfactory. Where the extra set of dark shades had been added for stereopticon work, a kind of vertical hinged slat arrangement was recommended, attached

(Concluded on Page 165)

[1]This is a study based upon visits to ten new high-school buildings in medium-size towns in the vicinity of Ann Arbor, Michigan.

The study was prepared under the direction of Professors J. E. Edmondson and Raleigh Schorling, School of Education, University of Michigan.

The Control of Light in Classrooms

Lawrence Louthian, Columbus, Ohio

The control of light is a real problem in modern school administration.

Defective vision is all too general. Of the 24,000,000 pupils enrolled in 1924 in the schools of the United States, 25 per cent possessed eye deficiencies. Furthermore, these eye defects are progressive in the sense that they become more numerous and more pronounced as the children advance from the lower to the higher grades.

Defective vision has much to do with retardation. The Eyesight Conservation Council[1] states that investigations have revealed that 67 per cent of a group of 28,667 public-school children with defective vision were retarded one or more years. Another group of 32,050, in which no consideration was given to the condition of the eyes, had 24 per cent of retardation. In a midwestern state, 2,185 rural-school children were examined and, of those who were retarded in their studies, 60 per cent had defective eyes.

The results accruing from the correction of eye deficiencies are most encouraging. Twenty thousand cases were sent to eye clinics; 60 to 70 per cent of these children were considered mentally deficient and were retarded. After the corrective measures had been taken, 70 to 80 per cent of the slow pupils were restored to their proper age-grade placement.

Proper lighting does much to prevent the necessity of corrective measures, and consequently it does much to facilitate the advancement of pupils. Good eyes have much practical value.

There are many things the board of education, the superintendent, and the teacher can do.

Science has determined that certain standards should be maintained; the law has provided that some things shall be done. More important, however, than anything scientists or legislative bodies can do is the action which issues from the common sense and initiative of school authorities.

When it is remembered that one child in four is handicapped by eye deficiencies, which in many cases can be corrected, that proper lighting will spare children from this affliction, and that this work can never be done without the cooperation of the school authorities, no responsible board of education, superintendent, or teacher will hesitate to do their part.

The board of education has the initial responsibility. It should give much attention to building plans and in so doing it should see that the proper quantity of light is available and also that the proper diffusion of light is possible. It should see that the facilities are present so that the teacher can reasonably be expected to promote the best of lighting condition.

Present-day Standards

The American Engineering Standards Committee, after a scientific study of this problem in 1924, approved a Code for Lighting School Buildings which was prepared and issued by the Illuminating Engineering Society and the American Institute of Architects. Included in this code is a table of light values which reads as follows:

Space Illuminated*	Minimum Required Foot-candles	Recommended Foot-candles
Walks, drives and other outdoor arcs if used at night	0.1	.05
Playgrounds, outdoor, if used at night	0.5	2.
Playgrounds, outdoor, if used at night for baseball, basketball, etc.	5.	
Storage spaces, passages, not used by pupils	0.25	2.
Boiler rooms, power plants, and similar auxiliary spaces	1.	3.
Stairways, landings, corridors, aisles, exits, elevator cards, washrooms, toilets, locker spaces, dressing rooms	1.	3.
Recreation rooms, gymnasiums, swimming pools	3.	7.
Work, Study or Reading Spaces Illuminated*		
Auditoriums, assembly rooms	2.	3.
Auditoriums, assembly rooms, etc., if used for class or study purposes	5.	10.
Classrooms, study rooms (desk tops)	5.	10.
Classrooms, study rooms (charts, blackboards)	3.	6.
Libraries, (reading tables, catalogues)	5.	10.
Libraries (bookshelves, vertical plane)	3.	6.
Laboratories, (tables, apparatus)	5.	10.
Manual-training rooms, workshops, etc.	5.	10.
Drafting rooms, sewing	8.	15.

*Where the space or work is not clearly evident, as for instance in an auditorium, the illumination may be measured on a horizontal plane 30 inches above the floor. However, where the space or work is clearly evident, such as stair steps and desk tops, the illumination shall be measured on the plane of the steps and desk tops respectively.

The National Lamp Works of the General Electric Company in its school-lighting bulletin offers these suggestions:

"*Number of Lighting Units.* In a standard classroom, 24 by 32 ft., six lighting units of the *direct type* should be used. This corresponds to one lighting unit of *direct type* for about every 130 sq. ft. of floor area, which is a good general figure to follow in classrooms which are not of standard size, and the floor area per lighting unit should not exceed 145 sq. ft.

"With lighting units of the *indirect* or *semi-indirect* types, fairly good illumination is obtained with only four units in a standard classroom, 24 by 32 ft. However, better results are obtained with six units. In general with lighting units of the *indirect* or *semi-indirect* types in classrooms which are not of standard size, it is preferable to have one lighting unit for about every 160 sq. ft. of floor area, and the floor area per lighting unit should not exceed 190 sq. ft.

"*Size of Lamp.* 1. With lighting units of the *direct* type;

"Where the floor area per lighting unit is not over 110 sq. ft., the minimum lamp size is 150 watts, and the recommended size is 200 watts.

"Where the floor area per lighting unit is between 110 and 145 sq. ft., the minimum lamp size is 200 watts and the recommended size is 300 watts.

"2. With lighting units of the *indirect* or *semi-indirect* type;

"Where the floor area per lighting unit is not over 140 sq. ft., the minimum lamp size is 200 watts, and the recommended size is 300 watts.

"Where the floor area per lighting unit is between 140 and 190 sq. ft., the minimum lamp size is 300 watts, and the recommended size is 500 watts."

The Actual Light Needed

It is obvious that there should be at least 5 and if possible 10 ft. candles at each desk in all classrooms. A widely accepted recommendation for elementary school buildings is a minimum of 6-foot candles. The board of education can specify that there shall be more window space than is required by the law of the state, and also more of artificial light.

The location of the windows is important. Unilateral lighting is the best system of diffusing natural light. There should be no windows at the rear of the classroom. Of course there should not be windows in the front wall, but there are many classrooms which have windows too far to the front along the window side. There should be 6 or 8 ft. of dead wall space at the front along the window side of the room, as the light from this source may be as injurious as any from a window in the front wall. Windows should not be more than 12 in. apart, in order that there may be even distribution of light. Plain or absolutely transparent glass will be a material aid both in diffusion and in transmission; the janitor rather than the teacher should see that the glass retains this quality. As the best light comes from the upper part of the window, the base of the window head should be as high as possible, not more than 6 in. beneath the ceiling, even though the room is higher than the minimum permitted by law. The height of all classroms should be not less than one half the width of the classroom. If a room is 24 ft. wide, it should have window space to a height of 12 ft. If the window space can be only 10 ft. high, the room should not be over 20 ft. wide.

The lowest point of the window should come well above the desk tops so that no light reflected upward from the areas outside the building strikes the eyes of children seated near the windows. Window sills may well be placed 30 to 36 in. above the floor.

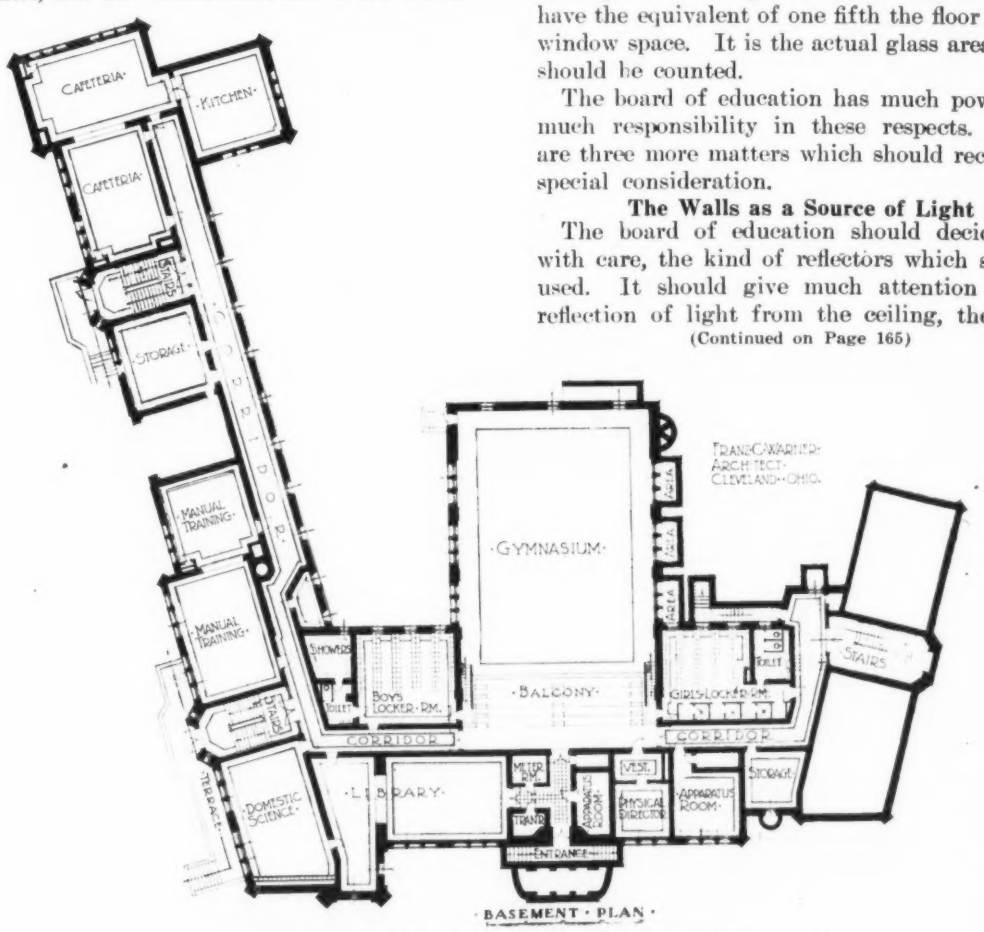
Finally, there should be an abundance of window space. It is generally considered best to have the equivalent of one fifth the floor area in window space. It is the actual glass area which should be counted.

The board of education has much power and much responsibility in these respects. There are three more matters which should receive its special consideration.

The Walls as a Source of Light

The board of education should decide, and with care, the kind of reflectors which shall be used. It should give much attention to the reflection of light from the ceiling, the walls,

(Continued on Page 165)



COVENTRY SCHOOL, CLEVELAND HEIGHTS, OHIO.
Franz C. Warner, Architect, Cleveland, Ohio. (See next page.)

[1] Bulletin No. 5, Eyesight Conservation Council, N. Y.

COVENTRY GRADE SCHOOL,
CLEVELAND HEIGHTS, OHIO.

Franz C. Warner, Architect,
Cleveland, Ohio.

Development of a Building Program in a Rapidly Growing Community

W. R. McCornack, Architect, of the Firm of Franz C. Warner and W. R. McCornack, Cleveland

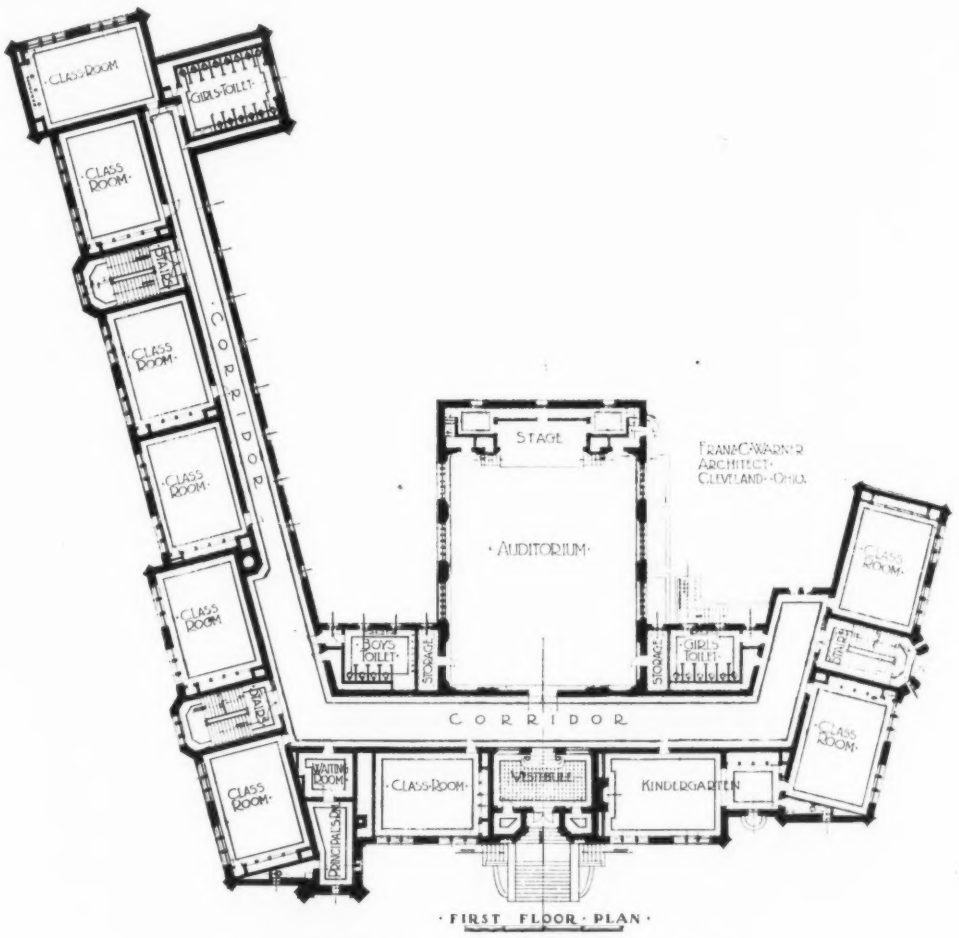
In our American cities a major portion of the residential growth takes the form of suburb development. The older cities have been surrounded long since by smaller independent municipalities, and the newer ones are rapidly developing them. This is particularly true of Cleveland, since the problem of rapid transit has been worked out in part and projected as a whole to provide proper transportation facilities for the outlying districts, making them practical places of habitation for people whose work is in the city. Thus the longing of many to live in the country and to escape the noise and dust of the city may become realized. The encroachment of industry also forces the population outward from the city proper.

Cleveland Heights is one of the suburbs which has solved the problem of providing school facilities for a phenomenal increase in population.

It is a young community, since its population in 1910 was only 2,955 and today it is 40,000. The school enrollment was 363 in 1910, and 2,466 in 1919, and 7,058 in 1927. Within the present area of the city and with the present building restrictions the population in 1940 is estimated at 110,000, which is considered to be the saturation point, but there will be changing restrictions which will undoubtedly raise the saturation point by many thousands.

The problem of developing a school system under conditions of such rapid growth has required intelligent study and a forward-looking educational policy.

The population of the city and the school enrollment increased very normally from 1910 to 1915, but in 1915 the population began to



COVENTRY SCHOOL, CLEVELAND HEIGHTS, OHIO.
Franz C. Warner, Architect, Cleveland, Ohio.

show signs of a very rapid increase, which has continued unabated to date.

When this change in population became evident, the board of education in 1916 made a survey of certain parts of Cleveland Heights to determine the growth and distribution of the school enrollment. This report was the basis of a bond issue for new buildings, but due to the fact that the issue was large and that the items were budgeted, it was defeated.

In the meantime the city continued its rapid growth, and the board did its best to keep pace in providing school facilities by starting the construction of one or two modern school buildings, the beginning of the present well-developed school plant.

In 1920 the board of education realized that steps must be taken for the purchase of sites and the erection of buildings on a definite plan, based on reliable estimates of the future growth. This was necessary for two reasons: first, to enable the board to buy sites on an acreage basis before they were subdivided into lots and built upon, and therefore, had become costly; and second, to be able to anticipate the school growth and to have buildings ready for use when the children were there and ready to use them.

Therefore, the board of education voted to conduct a survey to determine the school-building needs for the next twenty years.

Mr. P. C. Packer, then assistant superintendent of schools in Detroit and now dean of the College of Education in the University of Iowa, Mr. H. W. Anderson, now deputy superintendent of schools in Denver, and Dr. J. L. Brueckner, now professor of education at the University of Minnesota, were retained and a carefully studied program was worked out. This program has been followed without material modification.

The survey took into account the per cent of population increase, and this was based on the findings of investigations made by Barclay, Parsons and Klapp, for the proposed subway, and studies by the Water Department of Cleveland, and the Bell Telephone Company. The present and projected lot occupancy was also charted and taken into consideration.

Since the survey was completed, the increase in population has paralleled the forecast of the survey quite closely and the board of education has been able to look ahead and provide funds in advance of the immediate needs, so that the buildings were built and equipped when required.

The value of such a careful and accurate survey has been demonstrated in Cleveland Heights.

The chief recommendations of the survey were:

1. *Elementary Schools.* On the basis of an elementary school serving a territory within a radius of one-half mile, the board was advised to purchase 12 elementary-school sites, and the sites were definitely located by the survey.

The board now owns 9 of these sites and will acquire the others before the property increases in price and when the movement of population warrants it.

Buildings have been constructed on 6 of the 12 sites; another building will be constructed next year; and there is a group of portables at the eighth site awaiting the population increase which will justify a new building.

2. *Junior High Schools.* Establishing the maximum distance to be traveled by pupils as one mile, the survey recommended that 4 junior-high-school sites should be acquired. All 4 sites have been purchased and buildings have been erected on 2 of the sites.

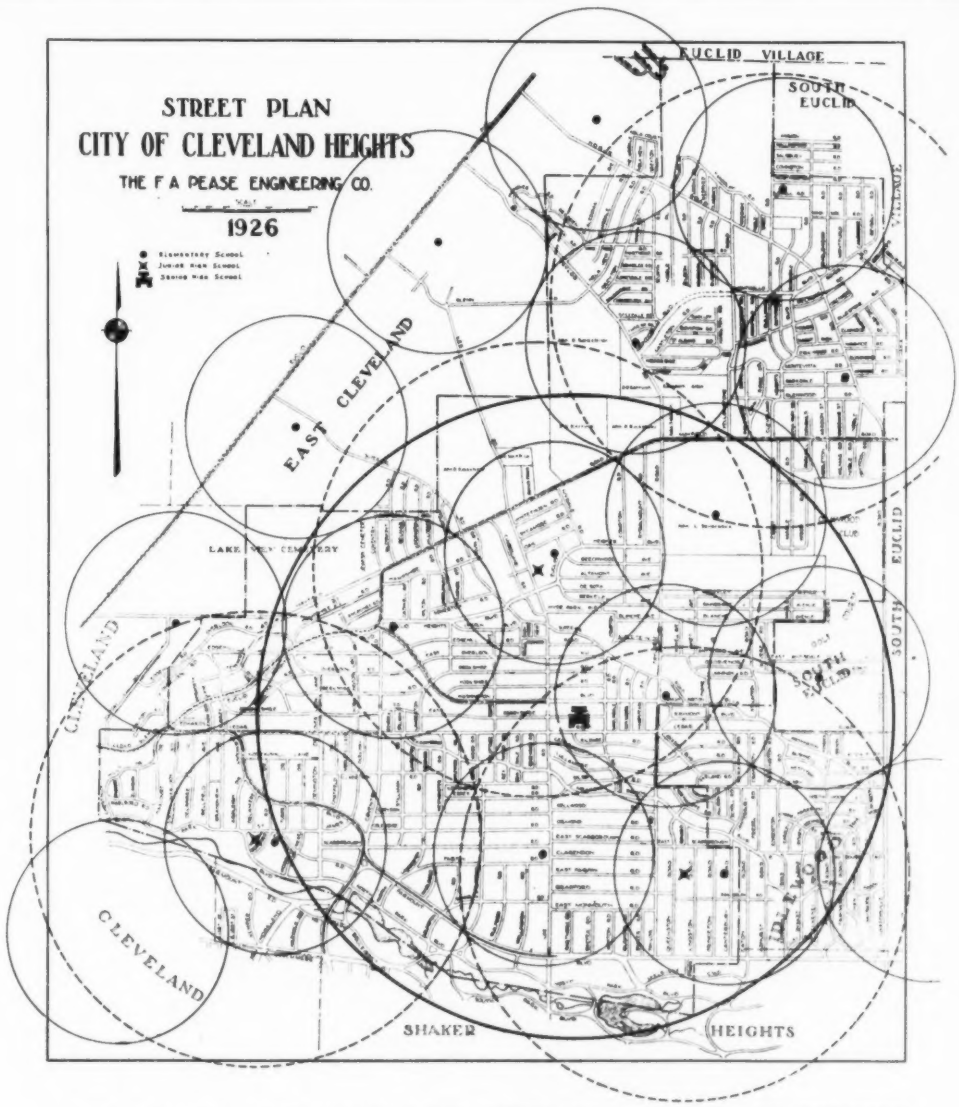
3. *Senior High School.* One senior-high-school site was recommended and this has been

AUDITORIUM, COVENTRY GRADE SCHOOL, CLEVELAND HEIGHTS, OHIO.
Franz C. Warner, Architect, Cleveland, Ohio.

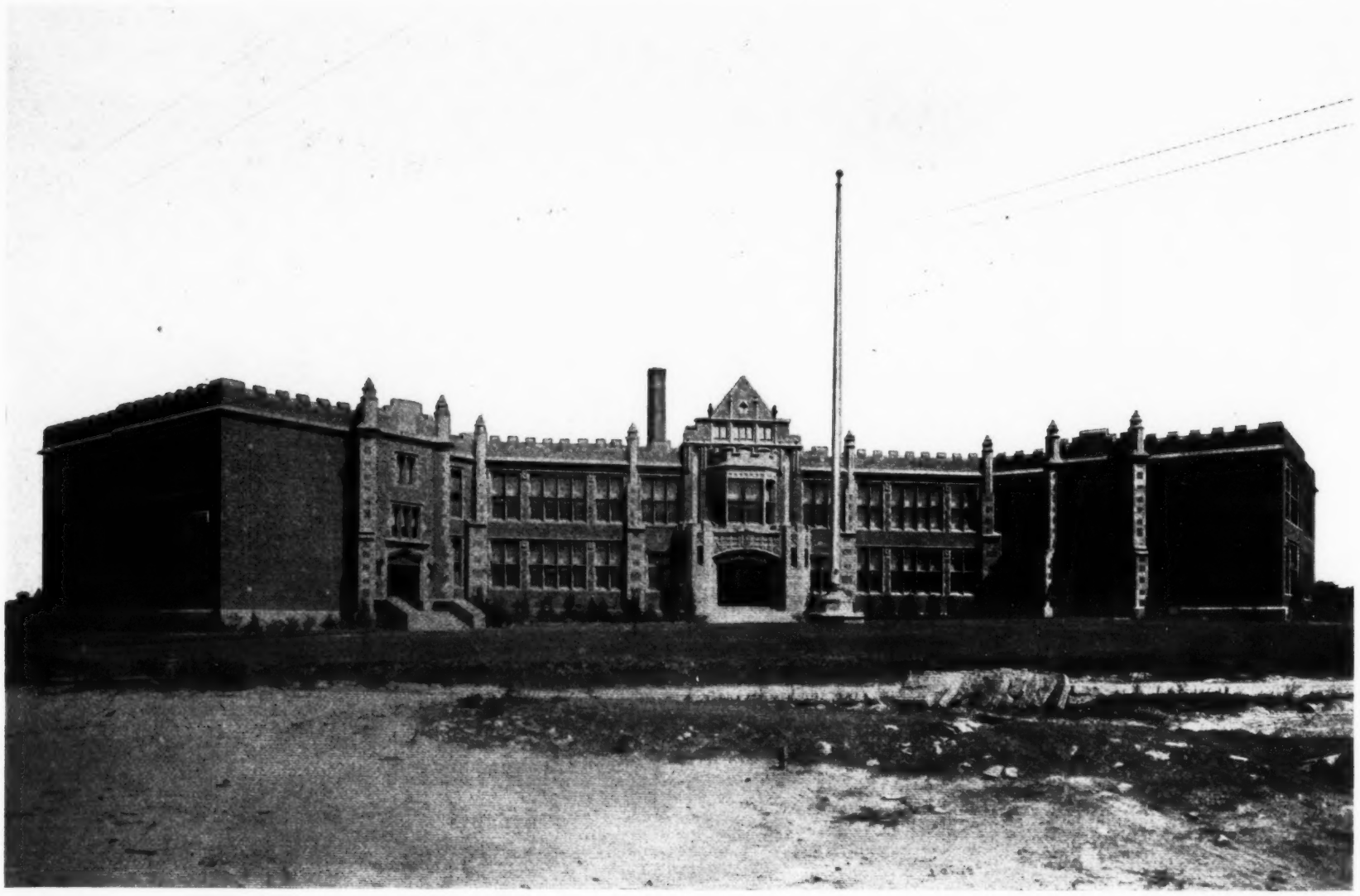
ELEMENTARY SCHOOLS

School	First Construction No. of Educ. Units	Year	First Addition No. of Educ. Units	Year	Second Addition No. of Educ. Units	Year
Fairfax	9	1914	21	1919	6	1927
Coventry	18	1915	8	1921	4	1926
Roxboro	26	1919	...	....	...	....
Noblem	9	1921	10	1927	...	....
Taylor Road	21	1923	5	1927	...	....
Boulevard	19	1923	4	1926	...	....
Totals	102		48		10	

Total Educational Units, Elementary Schools		160
Quilliams Site	9 Portables	
Canterbury Site	5 Portables	14
Other Rooms		4
Totals		178

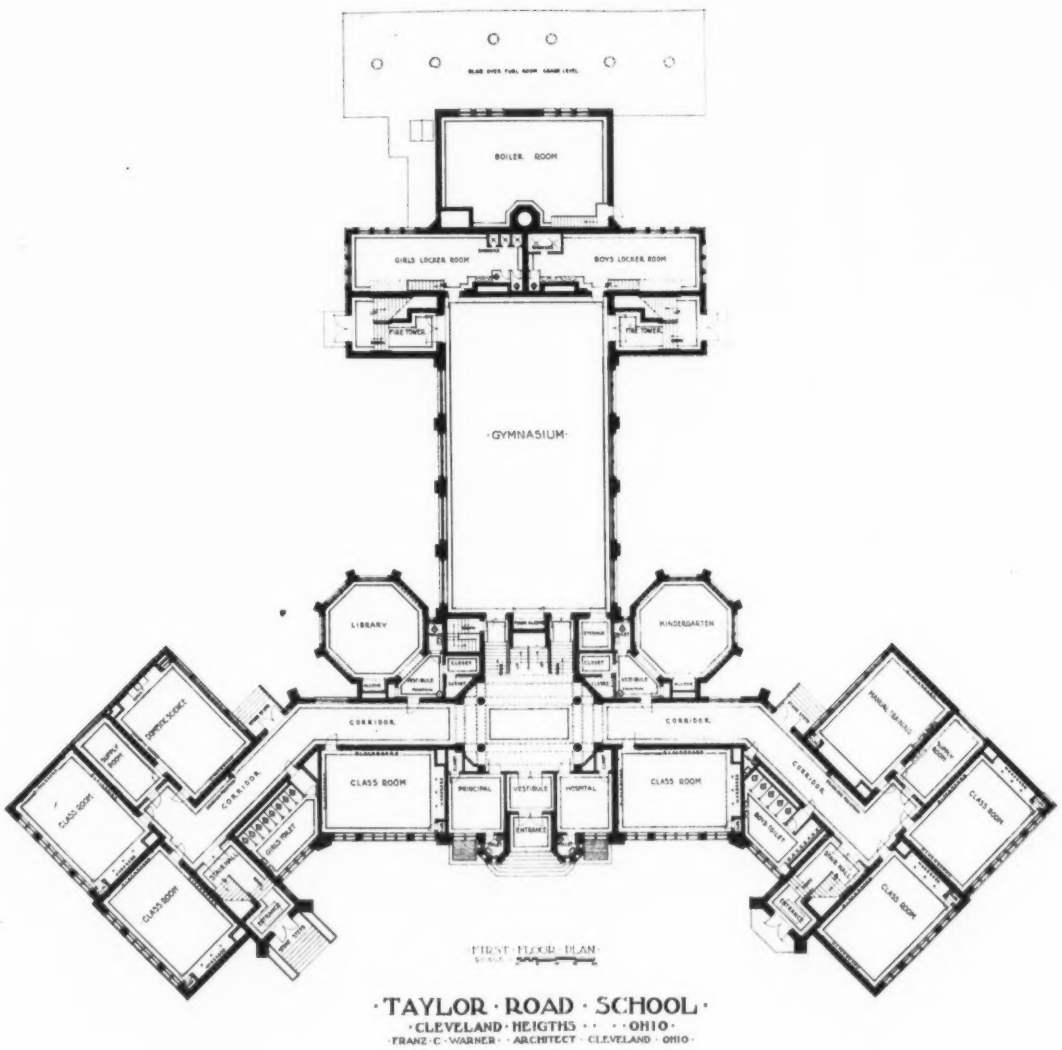


THE FINAL PLAN FOR LOCATING THE CLEVELAND HEIGHTS SCHOOL BUILDINGS.



TAYLOR ROAD GRADE SCHOOL,
CLEVELAND HEIGHTS, OHIO.

Franz C. Warner, Architect,
Cleveland, Ohio.



purchased and a building erected upon it which may be extended when the increase in enrollment justifies it. The survey felt that one high school would provide all the high-school facilities necessary for the community.

The street plan shows the relation of all of these sites to one another and to the adjoining schools in the surrounding municipalities.

The following table shows the growth of the building program since 1914 when the first modern school building was erected.

Junior High Schools

School	First Construction No. of Educ. Units	Year	First Addition No. of Educ. Units	Year
Roosevelt	19	1914	21	1917
Roxboro	26	1926	..	....
	45		21	
Total Junior-High-School Units.....				66

High Schools

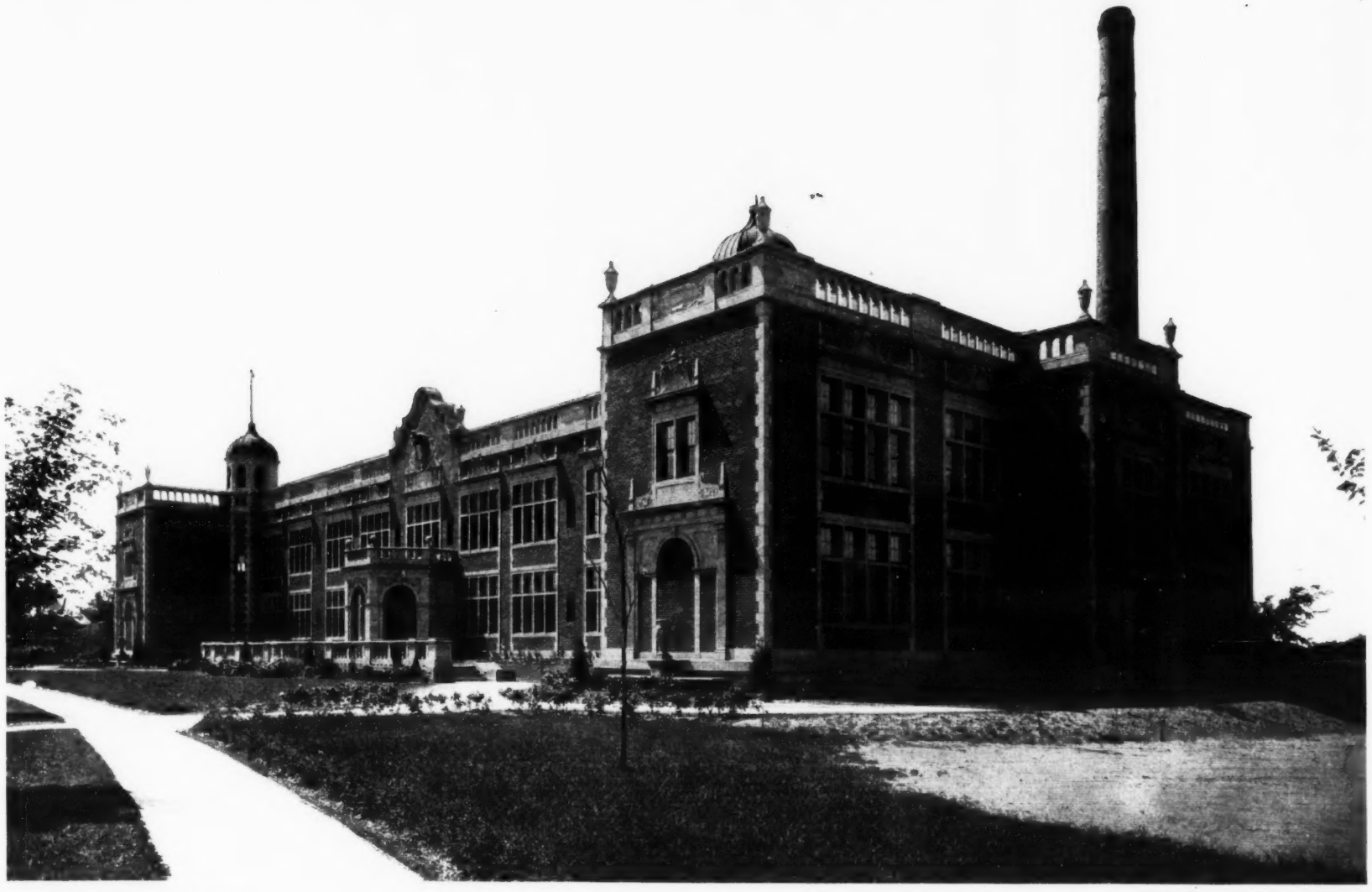
School	No. Educ. Units	Year
Heights High.....	68	1926
Total number of educational units of permanent construction for elementary schools, junior high schools, and senior high schools.....		294

Total number of educational units of all types, 312. This is an increase from the 11 rooms in 1910 to 301 educational units, or an average of 18 units per year.

The educational units include all rooms used for classes, assembly, library purposes, study hall, etc.

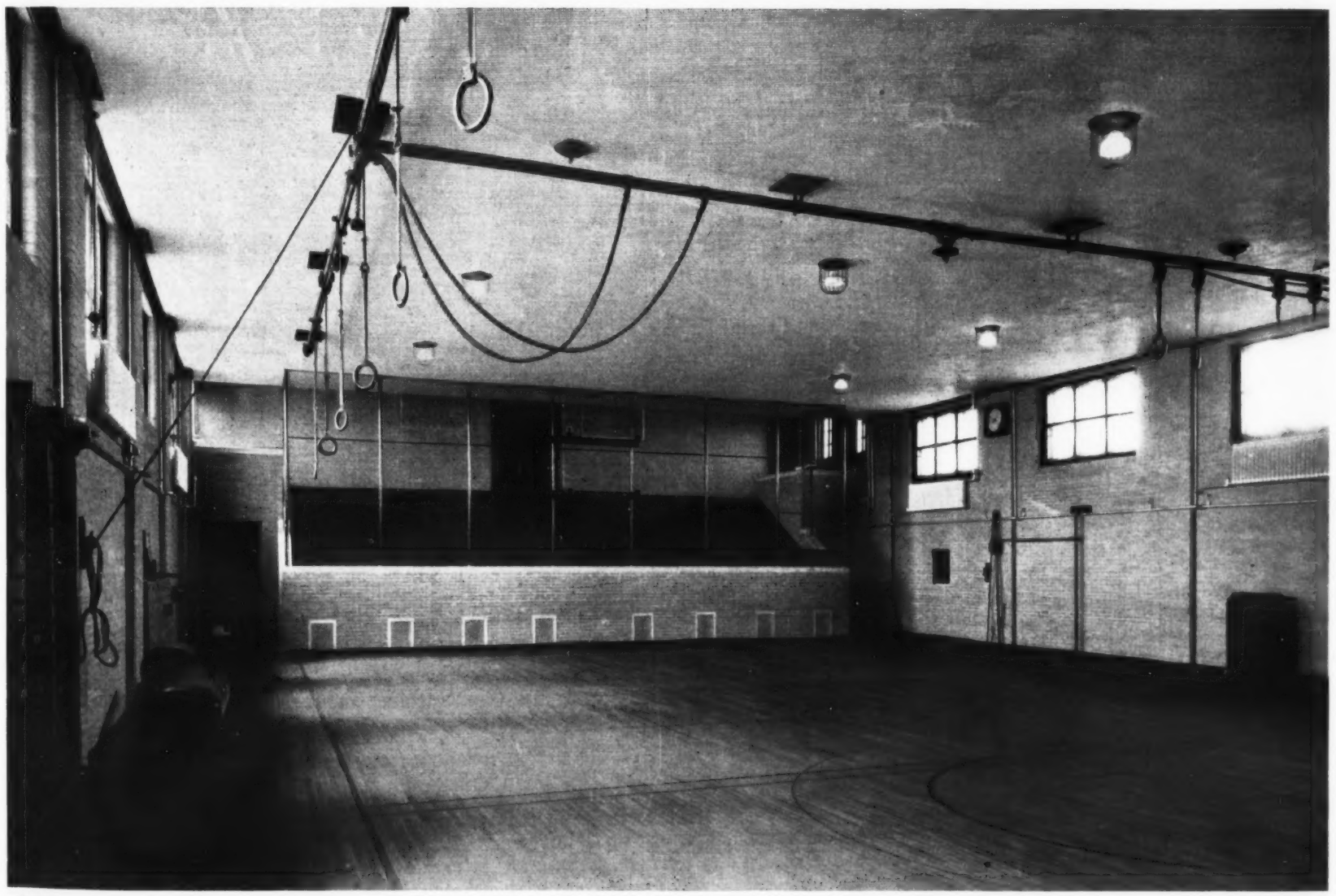
The buildings illustrated here are the ones which comprise the major portion of the building program and indicate the phenomenal growth of the community and the results obtained by the method followed to keep pace with the growth.

The high school which is the center of the system of buildings and the last building erected will be discussed in a later issue of the JOURNAL.



BOULEVARD GRADE SCHOOL,
CLEVELAND HEIGHTS, OHIO.

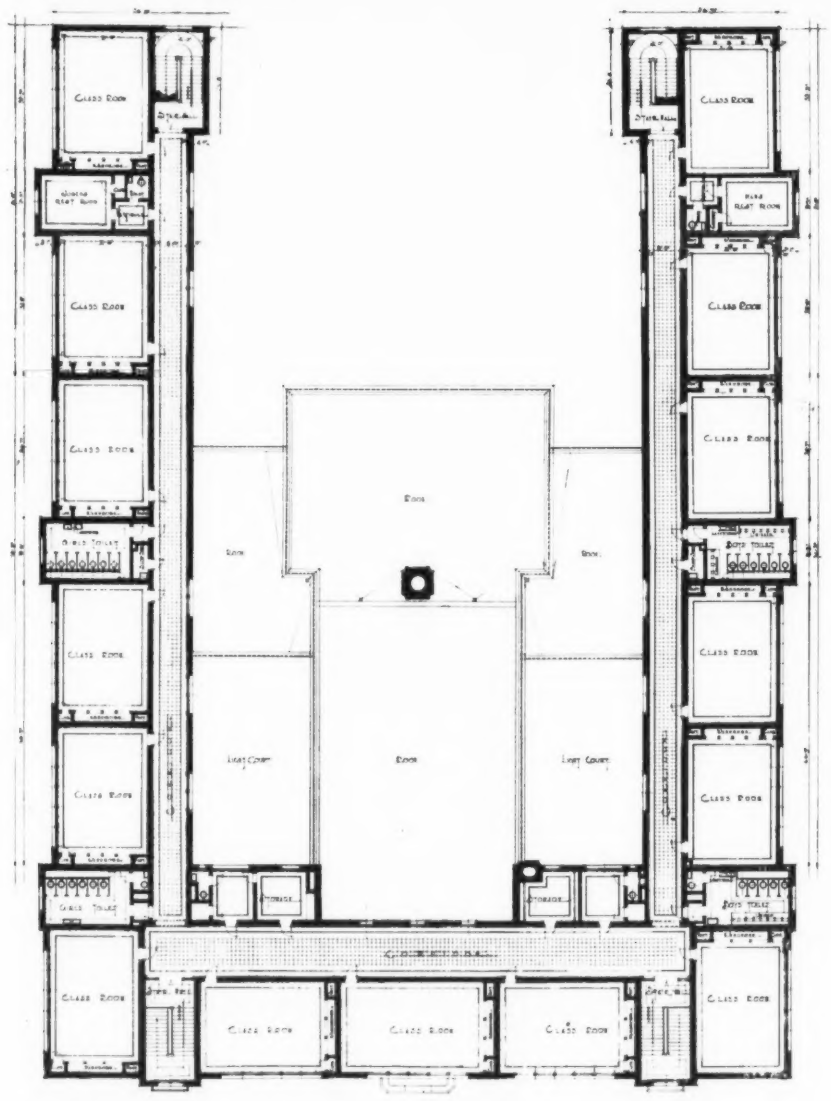
Franz C. Warner, Architect,
Cleveland, Ohio.



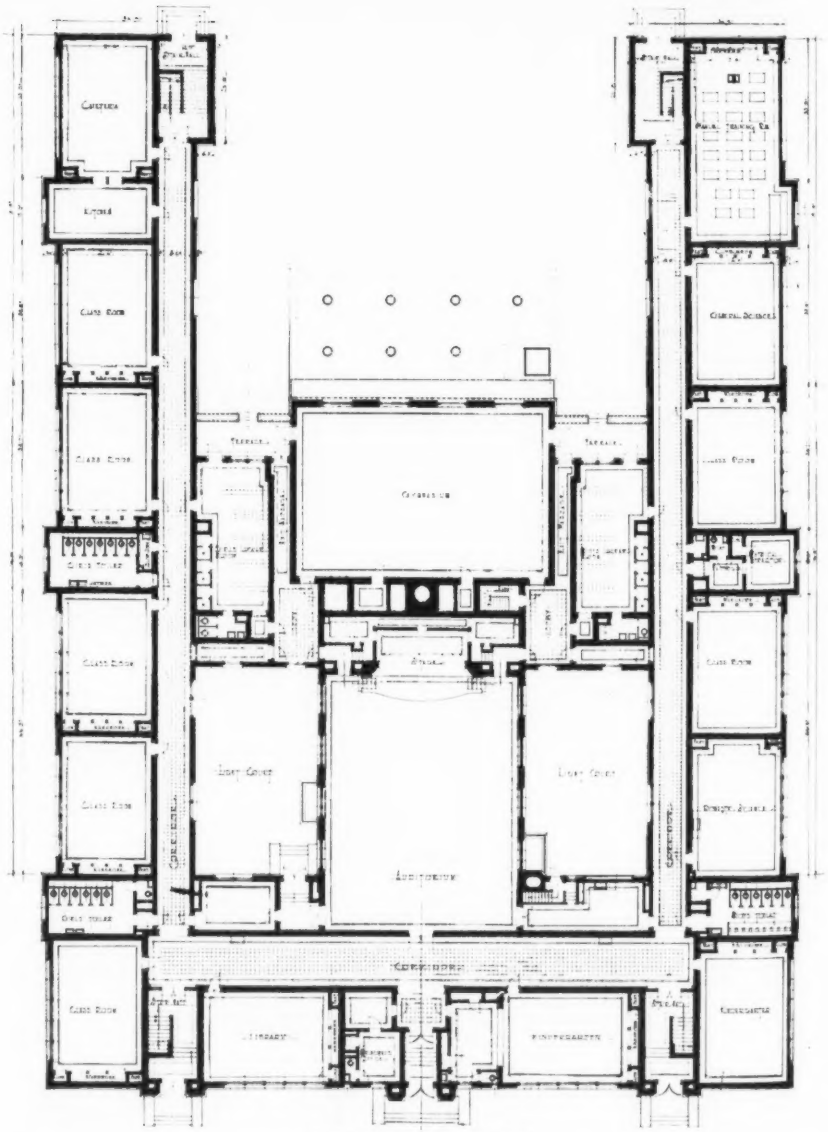
GYMNASIUM. NOBLE ROAD SCHOOL, CLEVELAND HEIGHTS, OHIO.
Franz C. Warner, Architect, Cleveland, Ohio.

FAIRFAX GRADE SCHOOL,
CLEVELAND HEIGHTS, OHIO.

Franz C. Warner, Architect,
Cleveland, Ohio.

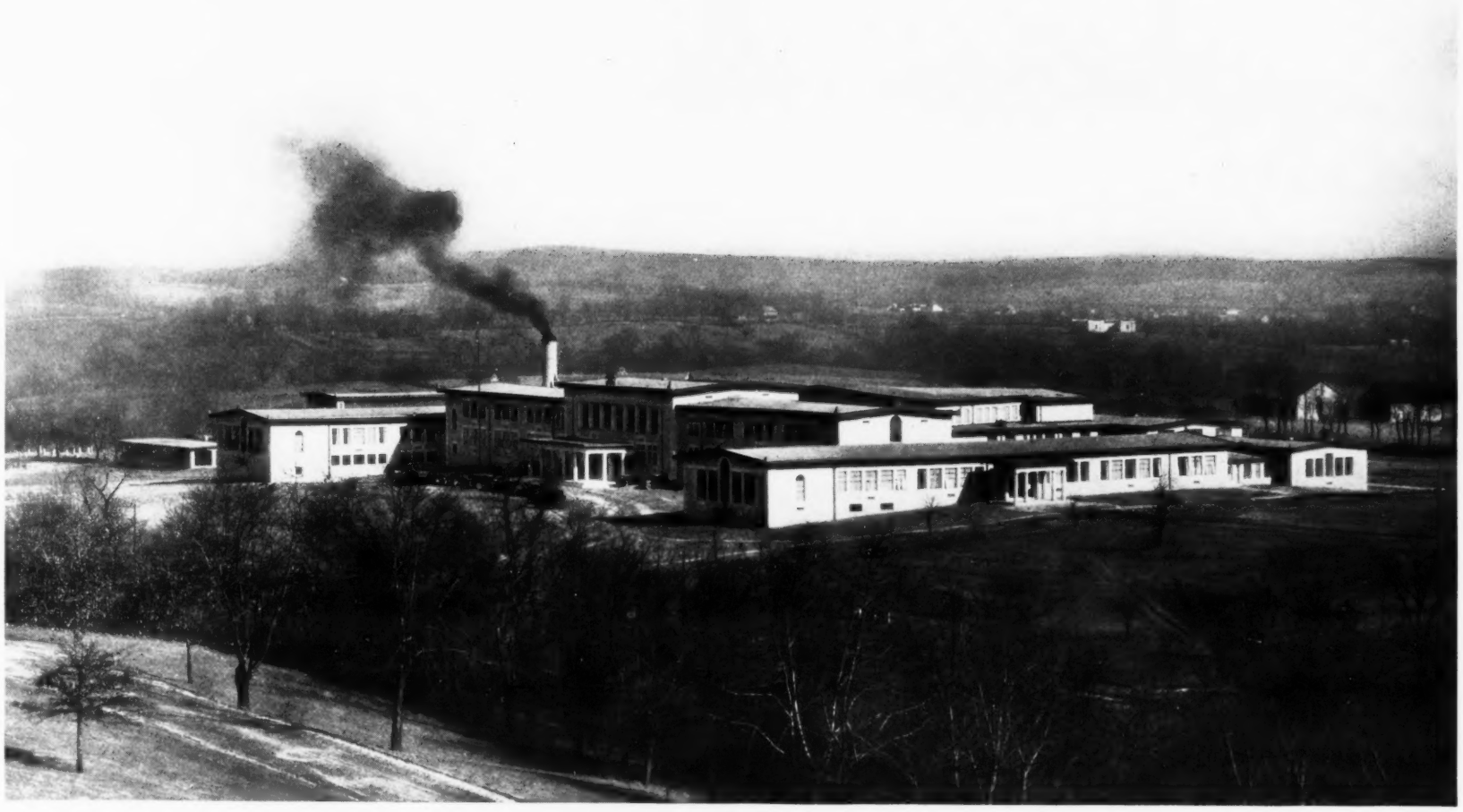


SECOND FLOOR PLAN



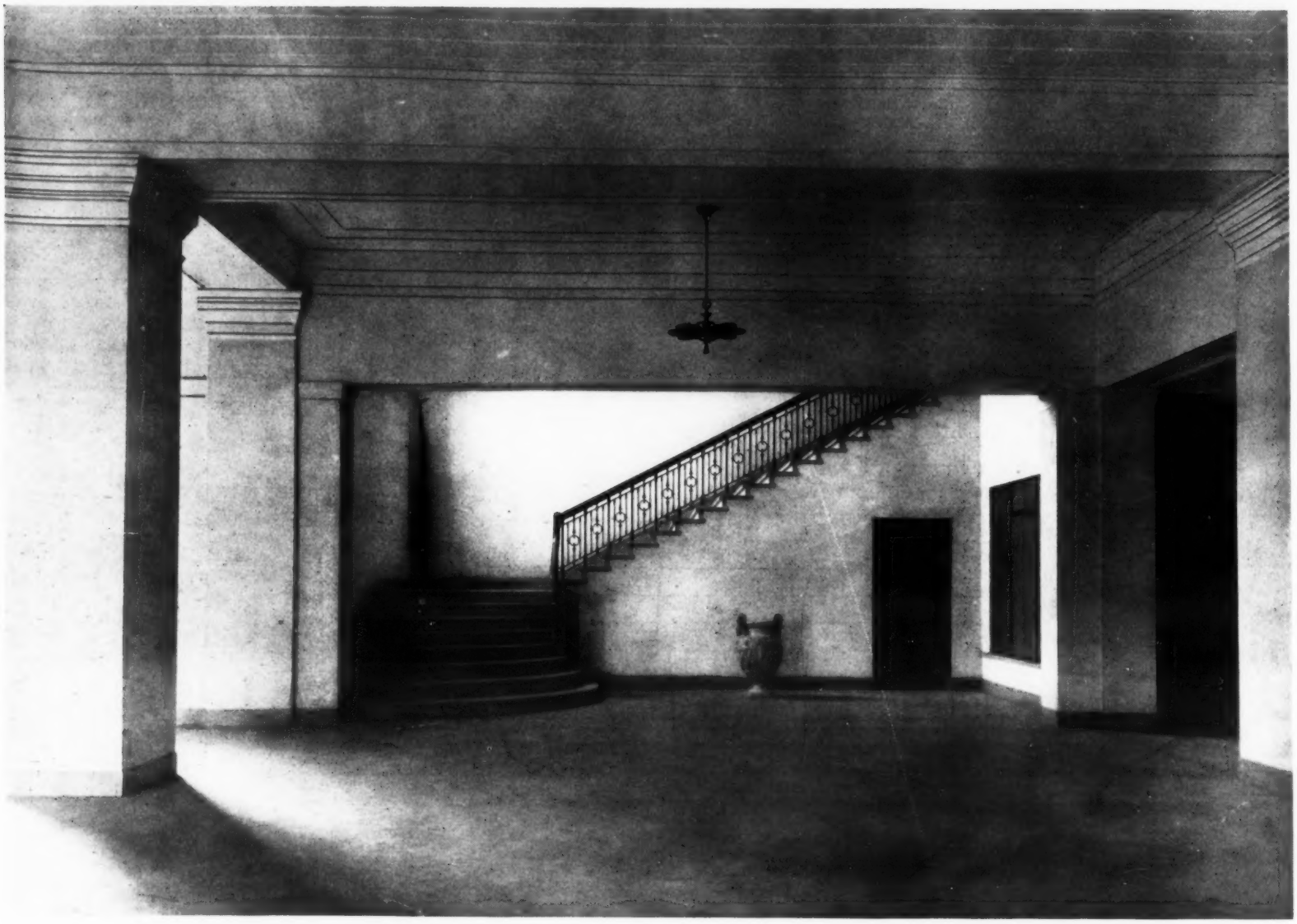
FIRST FLOOR PLAN

FAIRFAX SCHOOL, CLEVELAND HEIGHTS, OHIO.
Franz C. Warner, Architect, Cleveland, Ohio.

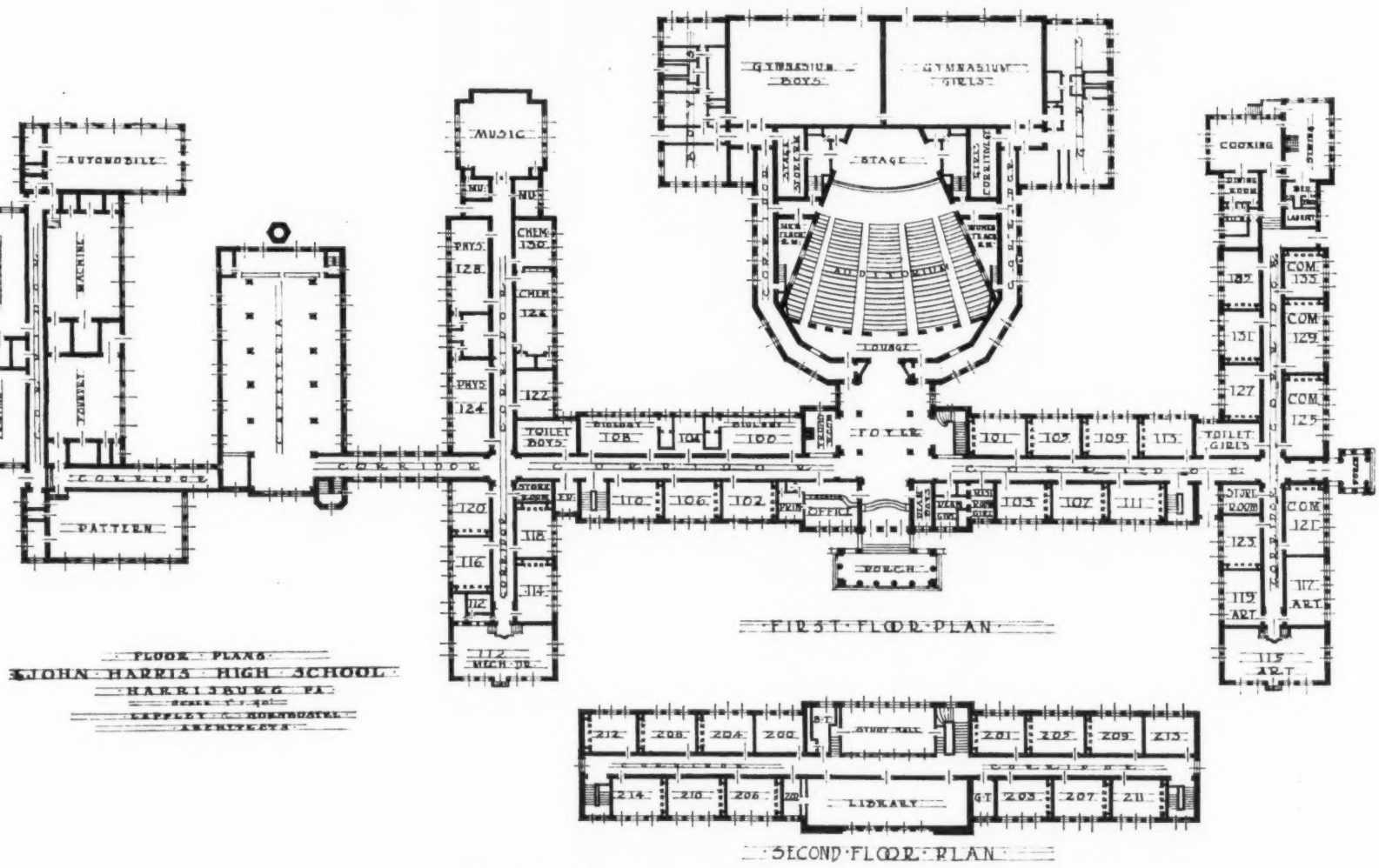


BIRD'S EYE VIEW OF JOHN HARRIS HIGH SCHOOL FROM RESERVOIR PARK, HARRISBURG, PA.
Lappley & Hornbostel, Architects, Harrisburg, Pa.

DETAIL OF ENTRANCE.
JOHN HARRIS HIGH SCHOOL, HARRISBURG, PA.
Lappley & Hornbostel, Architects, Harrisburg, Pa.



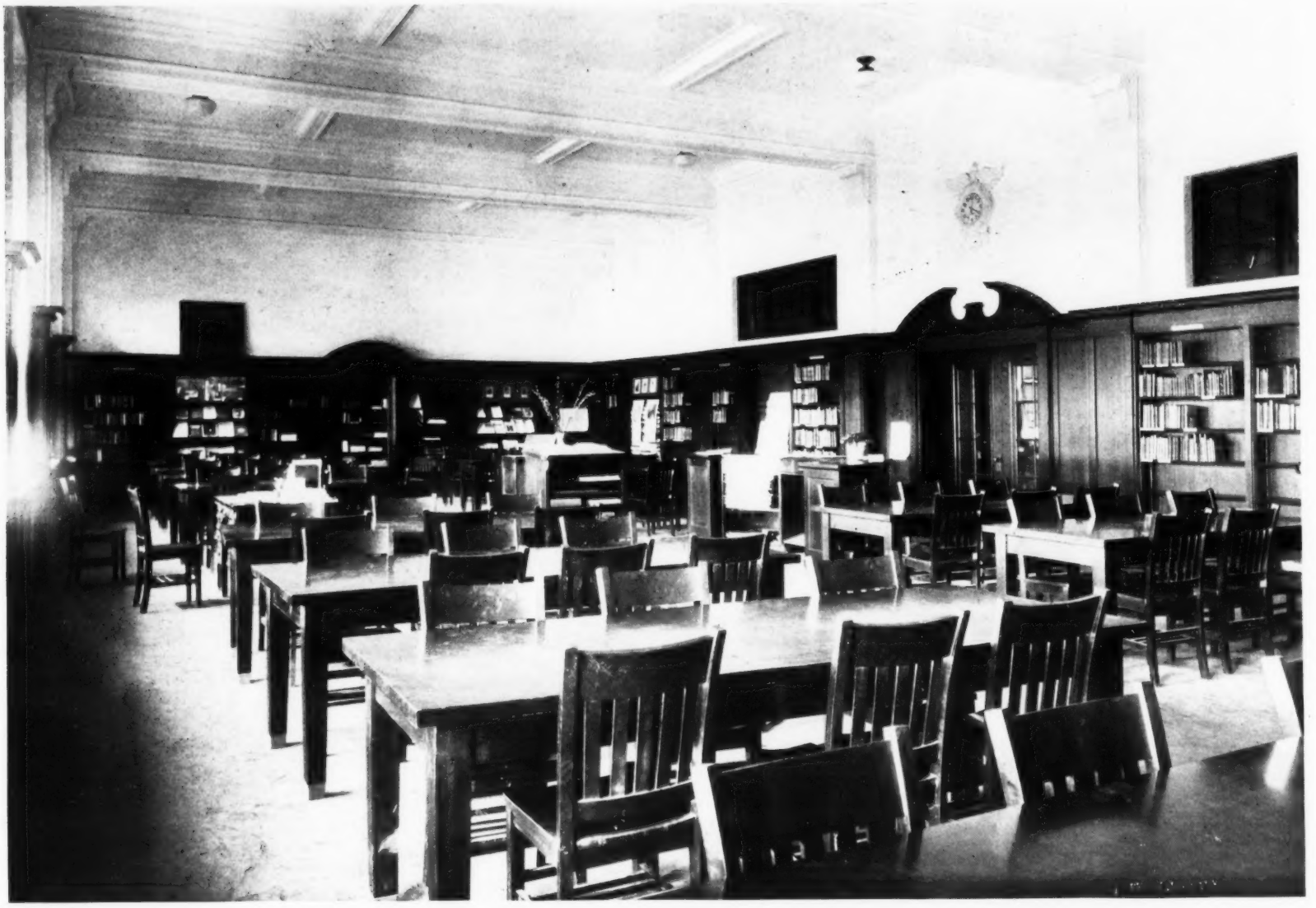
THE FOYER.



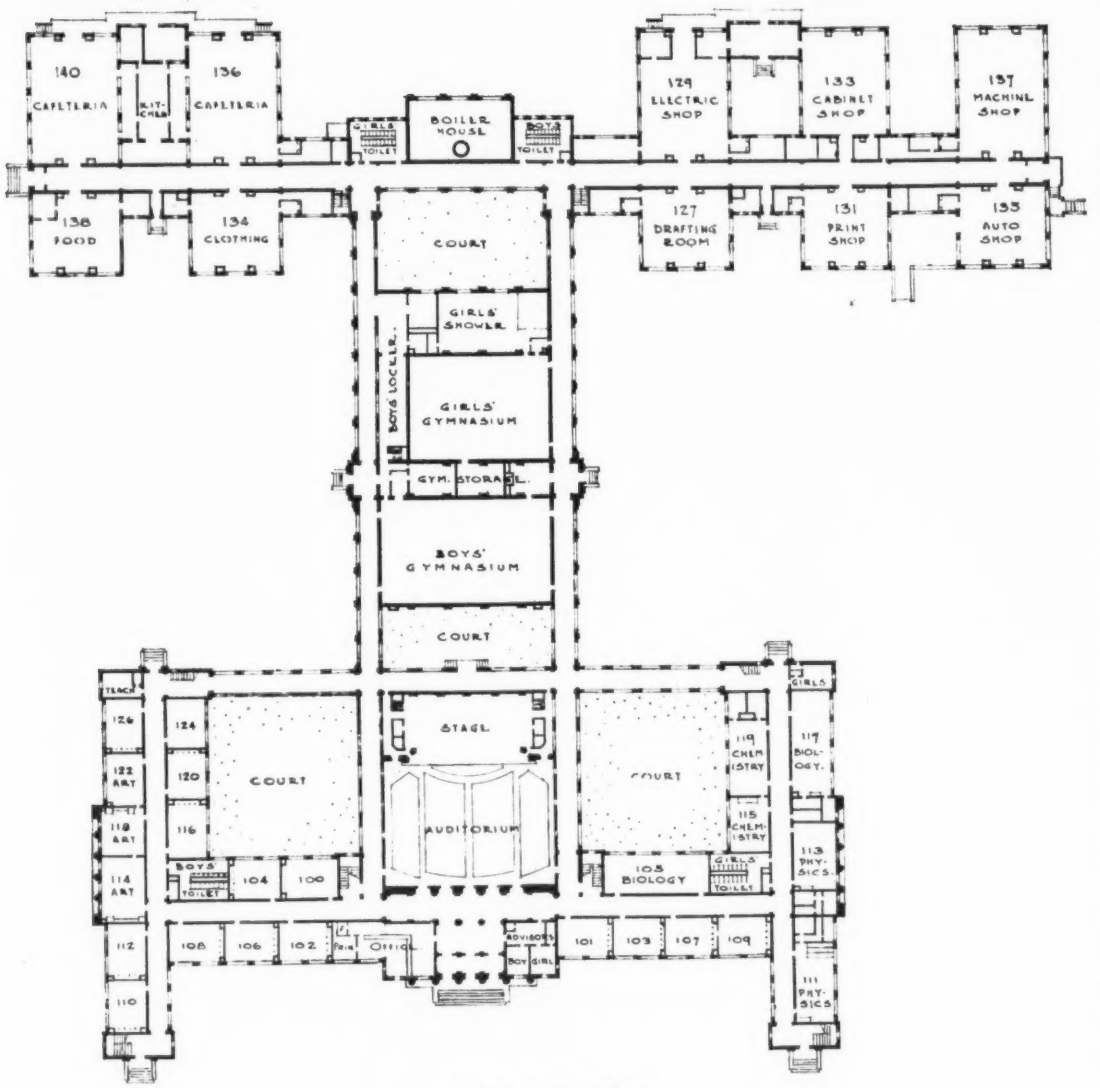
JOHN HARRIS HIGH SCHOOL, HARRISBURG, PA.
Lappley & Hornbostel, Architects, Harrisburg, Pa.

WILLIAM PENN HIGH SCHOOL, HARRISBURG, PA.
C. Howard Lloyd, Architect, Harrisburg, Pa.

DETAIL OF FRONT ELEVATION,
WILLIAM PENN HIGH SCHOOL, HARRISBURG, PA.
C. Howard Lloyd, Architect, Harrisburg, Pa.



LIBRARY.



FIRST FLOOR PLAN,
WILLIAM PENN HIGH SCHOOL, HARRISBURG, PA.
C. Howard Lloyd, Architect, Harrisburg, Pa.

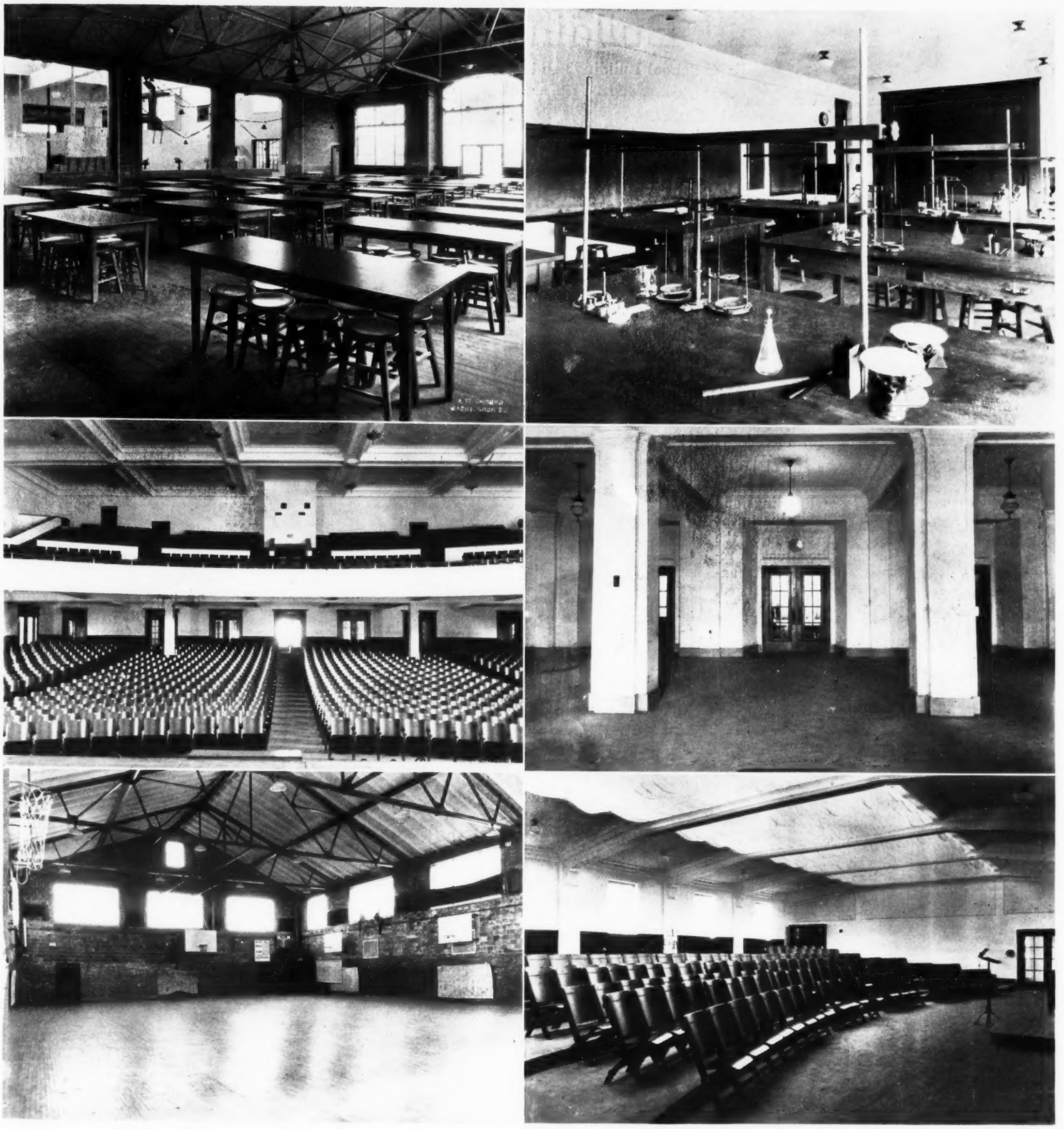
THE NEW HARRISBURG HIGH SCHOOLS

The American people are self-assertive and do not hesitate to support or oppose public projects in keeping with their respective viewpoints. Their democratic views of life and government present a questioning attitude of mind to nearly every project, particularly when large expenditures of public funds are involved. These facts necessitate leadership of no small quality on the part of boards of education, superintendents, and, in fact, all public officials in executive and policy-making positions. As a rule the successful conclusion of a large public work, like a schoolhouse or other public building is as much a monument to the initiative and fighting qualities of the men who proposed it and followed it through, as it is a means of carrying on a branch of public business.

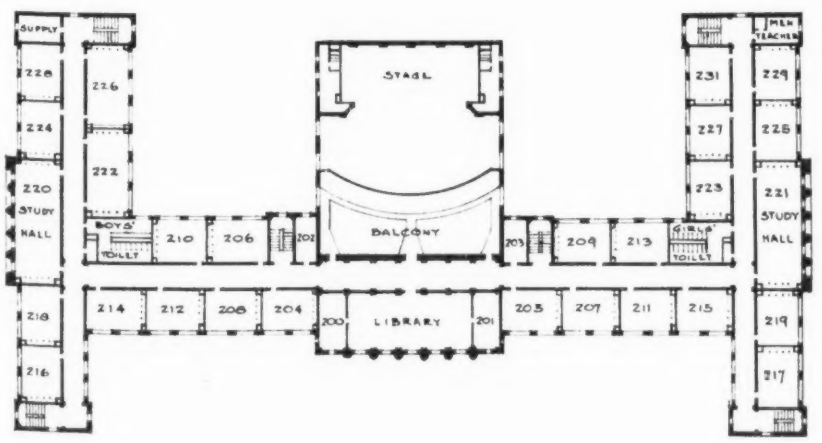
The two new high schools erected at Harrisburg, Pa., and hereinafter described, deserve full mention, not only because they are in themselves meritorious, but also because of the successful culmination of a splendid vision entertained by the thoughtful minds of Harrisburg and of the foresight of the school board and its executive officers. Minor notions and prejudices may have for a time clouded the larger objective, but with the passing of time and the practice of patience the public mind fully supported the project itself and saw before it a course of procedure that finally burst into splendid realities.

In this struggle differences of opinion swayed the public mind, but the authorities were clear in their own minds as to the needs of the school system. There was one calm and coordinating force that held studiously to the essentials of a modern school structure and the general exigencies of the situation. That man was Superintendent George H. Garwood who had made an intensive study of modern school architecture,

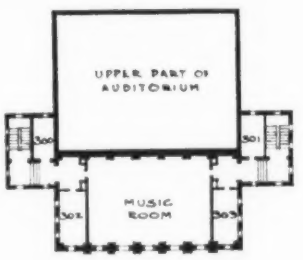
(Continued on Page 166)



INTERIOR VIEWS OF WILLIAM PENN HIGH SCHOOL, HARRISBURG, PA.
C. Howard Lloyd, Architect, Harrisburg, Pa.
TOP: One of Two Cafeterias and Physics Room: MIDDLE: Auditorium from Stage and Hall in Front of Auditorium: BOTTOM: Gymnasium and Music Room.



PLAN OF THIRD FLOOR.



SECOND AND THIRD FLOOR PLANS,
WILLIAM PENN HIGH SCHOOL, HARRISBURG, PA.
C. Howard Lloyd, Architect, Harrisburg, Pa.

School Building in Arkansas

C. M. Hirst, Head of the Division of School Buildings and Grounds, State Department of Education, Little Rock, Ark.

The betterment of school buildings in an entire state involves a problem which is a challenge to the department of education of the state. During the past three years the State of Arkansas has looked upon its need for vastly improved school buildings as a call to battle against poor design and construction in schoolhouses, by means of a carefully worked out policy of advice and help to local school boards.

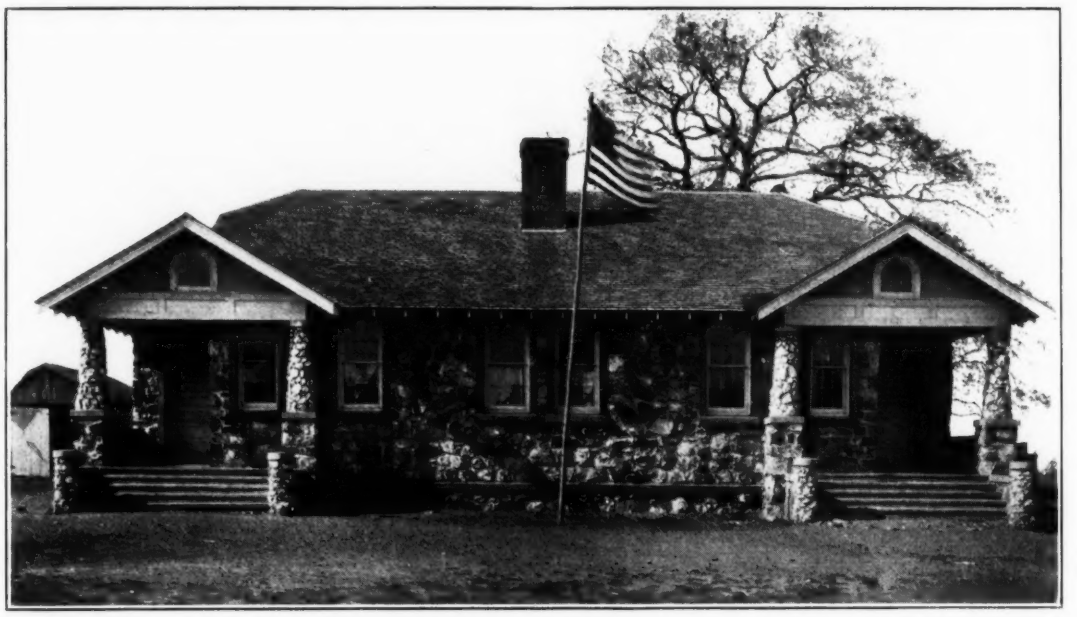
Practically nothing was done to solve the problem of adequate school buildings for nearly a hundred years after Arkansas became a state. A few of the state superintendents of schools referred to the problem in their biennial reports and one superintendent, in 1879, offered "some plans to awaken thought and inquiry in this direction and lead to the adoption of better plans." A later superintendent, J. L. Bond, prepared model plans and specifications for rural schools, but since no one officer in the state department of education was directly made responsible for promoting better school building, very little was accomplished.

On July 1, 1924, a Division of Buildings and Grounds was organized in the state department of education, with a director in charge of the work. A rapid examination of the situation revealed the fact that school buildings in Arkansas were poorly lighted, awkwardly arranged, and poorly constructed. Only 477 of the 6,616 schoolhouses in the state had been erected according to plans that met elementary standards set up by the department of education. Many rural school buildings projected or under construction were being planned by carpenters, contractors, or others who had agreed to furnish the drawings for the least fee.

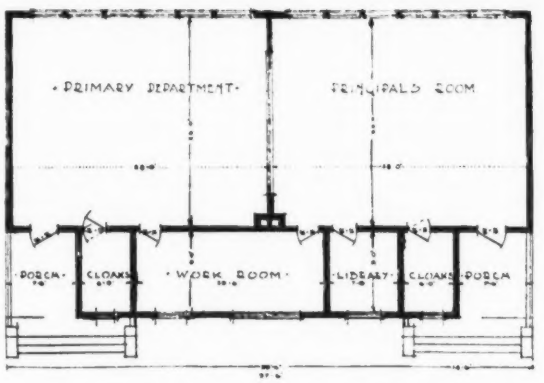
As an initial program of work the Division of School Buildings and Grounds proposed to undertake six types of service, as follows: (1) to furnish site plans for schools; (2) to supply building plans for small communities where efficient architectural service could not be obtained; (3) to prepare preliminary floor-plan sketches for larger buildings after a survey of the needs of the community had been made; (4) to check the plans of architects upon the request of architects or school boards and suggest revisions; (5) to advise with school officials concerning the remodeling or altering of existing school buildings; and (6) to advise with school boards, superintendents, and teachers in problems of interior arrangement, furniture, and equipment of school buildings.

What the Division Has Done

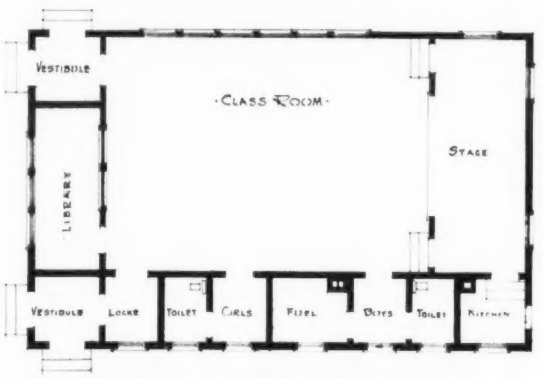
During the three years of its existence the division has furnished ground plans or plot plans for more than 100 communities. It has supplied building plans to 402 communities in which 270 schoolhouses have been erected. Only 2 of these communities have failed to use the state plans and have elected to use their own building designs. During the first year of the division's activity, 48 per cent of all school buildings erected in the state were built from state plans or plans approved by the division. During the second year, 71 per cent of the buildings were erected from state or approved plans; and during the year ending July 1, 1927, 87 per cent of the buildings erected were based on state or approved plans. School buildings have been erected from state plans in 72 of the 75 counties, and the division has rendered other architectural service in 74 counties. Ten counties have built schoolhouses from state or approved plans only. Preliminary plans have been furnished in 108 communities; architects' plans have been asked for 30 communities; 84 school buildings have been repaired and remodeled under the direction of the division; and a large number of school districts have availed themselves of the opportunity to secure advice and suggestions concerning the interior arrangement and equipment of their buildings.



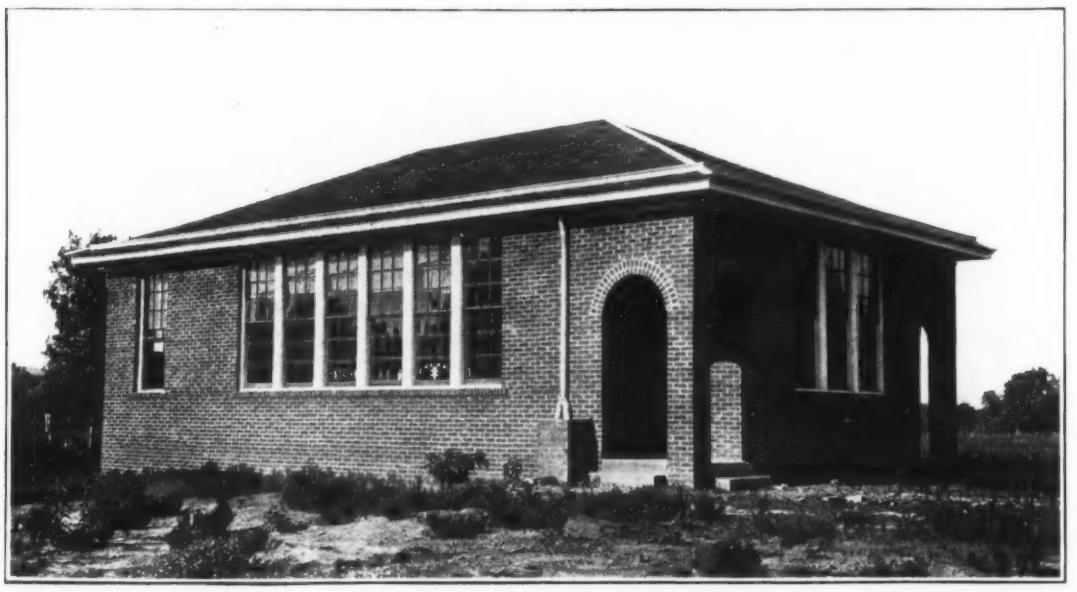
DALLAS SCHOOL, POLK COUNTY, ARK.



FLOOR PLAN, DALLAS SCHOOL, POLK COUNTY, ARK.



FLOOR PLAN, MARCHE SCHOOL, PULASKI COUNTY, ARK.

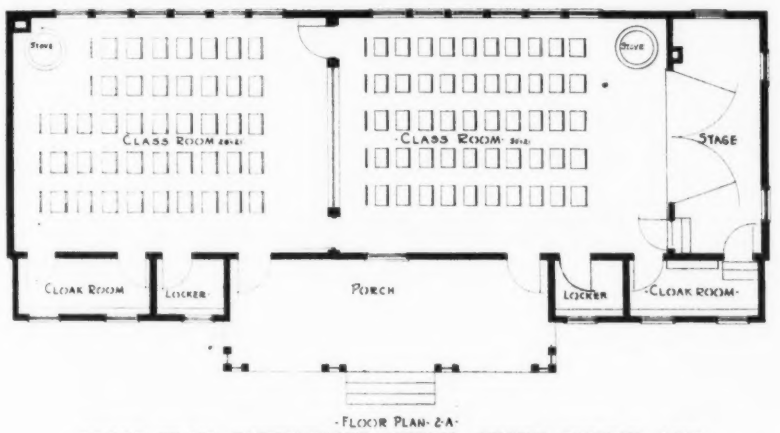


MARCHE SCHOOL, PULASKI COUNTY, ARK.

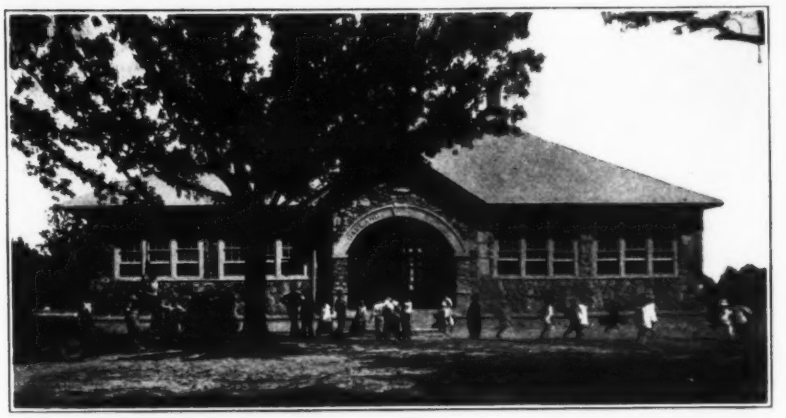
Efficient Architectural Service Needed

Since its organization the division has directed its attention most largely to rural schools because conditions in the rural districts have exhibited the greatest distress and need for help. Where small school districts could not employ efficient architectural service, plans for small buildings have been furnished. These plans have included one-, two-, three-, four-, five-, and six-teacher schools. The general plans and elevations and the specifications have been complete, but quite simple so that any experienced contractor or builder may follow them with perfect assurance. The plans are not considered fixed or permanent but will be changed from time to time as new needs and special situations have made revision desirable. The exterior design of existing plans are changed each year to avoid monotonous and tiresome architectural likeness of all schools. The division does not pose as an architectural organization and the state department of education does not believe that architecture is within its field of service. It is believed that a deadening sameness of all schools would result if the department entered the field of architecture and that it would require a larger force than the state would feel justified in employing.

COTTONWOOD SCHOOL, BOONE COUNTY, ARK.



FLOOR PLAN, COTTONWOOD SCHOOL, BOONE COUNTY, ARK.



OAKLAND SCHOOL, RANDOLPH COUNTY, ARK.

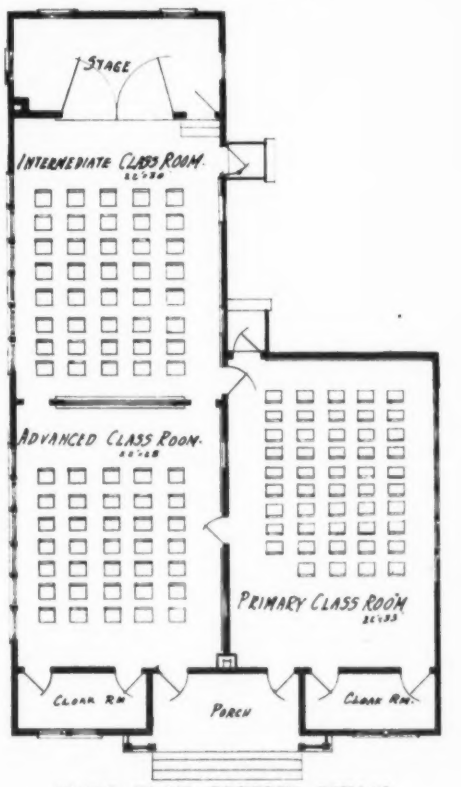
An important work of the division is the survey of school building needs in towns and larger communities and the preparation of reports outlining for the school boards and architects the types of school plants needed. These studies and reports constitute a type of service which determines in suggestive form the number and kinds of rooms needed and harmonizes the educational and building programs with the financial abilities of the communities. Any advice and information which the school authorities or the architects may require is furnished. This service leaves to the architects the very difficult problems of developing the individual plans and specifications for each building and of designing buildings that will reveal to the public the type of activities carried on inside the structures. It also leaves to the architects the problem of harmonizing each building with its environment and of making it a structure of beauty, permanence, and inspiration to the community.

Larger Units Needed

The Arkansas department of education is not encouraging the continued erection of one- and two-teacher schools. The department is committed to a program of school consolidation, and surveys are being made in the different counties in cooperation with the county superintendent of schools, leading to consolidation. Wherever conditions permit, school centers are being established for the location of secondary and elementary schools, and the idea of arranging as large units as possible and of placing high school advantages within the reach of every boy and girl is actively being promoted. The state can safely plan its schools with this purpose in mind in view of the fact that it has already provided for the expenditure of nearly $100,000,000 for roads in the next four years. As rapidly as good roads are built, school centers will become more readily accessible and consolidation of schools will be more easily accomplished. The state has found that the road-district plan of financing road construction is expensive and hazardous. The same observations hold true concerning the erection of school buildings. In many cases proper consolidations cannot be made because the initial cost of adequate new buildings represents a greater outlay than the thinly populated school districts can bear. The state, however, can afford to build its schools, as it is building its roads, by making schoolhouse construction a concern of the state rather than a concern of the school districts. The state department of education is insisting that all funds contributed by the state be administered on an equalizing basis. It is also using its revolving loan fund

(Continued on Page 94)

ROBERTS SCHOOL, PULASKI COUNTY, ARK.



FLOOR PLAN, ROBERTS SCHOOL, PULASKI COUNTY, ARK.

THE AMERICAN
School Board Journal

WM. GEO. BRUCE
WM. C. BRUCE } *EDITORS*

EDITORIAL

SCHOOL COSTS IN THEIR RELATION TO GENERAL MUNICIPAL COSTS

The taxpayer has been frequently told in recent years that fully one third of the costs of local government go for the maintenance of the schools. His attention is, therefore, directed to the one third expended for schools rather than to the two thirds expended for other municipal activities. While the schools demand more money today than they did twenty years ago, it also follows that every branch of city government involves a higher cost of maintenance.

Over 40,000,000 people, or nearly one third of the population of the United States, are now residents of cities. These centers of population must have sanitary, fire, and police protection, they must be provided with recreational centers and breathing spots, and must be provided with hospitals and charitable institutions. All these agencies involve large sums of money.

It is said that much more is demanded of the schools today than was demanded a quarter of a century ago. Likewise it may be said that much more is demanded by the urban denizen in the way of protection as far as his physical and moral welfare is concerned. Life and property call for stronger protective agencies where population has become congested, or where industrial and commercial activities are conducted upon an intense scale. The public demands more at the hands of government and consequently is called upon to pay more.

The United States census bureau tells us that there were 146 cities in 1913 having a population of 30,000 and over. The amount spent per capita was $32.46. In 1923 this had risen to $68.99, or an increase of 112 per cent. It is found, too, that the per-capita net indebtedness of the cities was $69.28 in 1913 and $119.45 in 1925.

A statement made by D. C. Westenhaver in 1895 has application to the situation as found in 1927. He then said: "The simple truth is—and herein lies the chief fact of the whole subject—that this increase of indebtedness and in the rate of taxation is not due in the main or even in large part to jobbery or corruption or wasteful extravagance, but is due to an extension of the sphere of governmental activity, calling for large revenues which our antiquated systems of state and local taxation are unable to produce. I repeat, governments as now organized, are expected, nay, compelled by wishes of the people to assume new functions and undertake new duties. . . . By these means the world has been made a better place to live in. Man has increased in mental, moral, and physical stature. The sum total, as well as the average distribution of these things which go to make life more comfortable, have increased. There is a sound reason why debts and tax rates have increased . . . and that increase of expenditure is not only unavoidable, even if undesirable, but that it is going to continue. This tendency is worldwide."

Thus, the citizen who feels that his taxes are largely increased because the schools cost more money, is told that all branches of government have become more expensive. He is also told that if government on the whole costs more money, it is because he demands more and receives more at the hands of government.

THE MISSION OF THE MODERN SCHOOL ARCHITECT

For many years pet phrases, such as "as the teacher, so is the school," or "as is the school board, so is the school," and the like, have been advanced. Today no one disputes that the first essential to a good school is a good teacher, but everyone knows it takes an efficient superintendent, supported by an efficient school board, to select an efficient teacher. And no teacher, superintendent, and school board can provide good teaching unless the pupil-teacher housing is safe and sanitary, and adapted in all its appointments to the business of the school.

With the expansion of America's system of popular education, its amplification into wider areas, the architecture of the schools has undergone a great change. Twenty-five years ago the writer of this editorial wrote a manual on school architecture. The novelty of the book was that it aimed to approach the subject, not from the architect's or builder's point of view, but from the school administration side only. Today the book is obsolete.

The changes which have entered the field of school administration have called for a higher specialization in the architecture and to an extent that will more adequately meet its wants and needs. Today the architect can no longer place a set of colored drawings under his arms, wander into a school-board meeting and persuade the members by his eloquence into a contract.

The school official of today not only knows something about the essentials of a modern school structure himself, but knows how to exact higher architectural service as well. All of which means that the architect must know something of the operations of the school itself. He must know what the curriculum provides in the way of studies, and how to plan his structure to permit the convenient, expeditious, and efficient operation of such curriculum. In other words, the architect of today who attempts to plan a modern schoolhouse is closer to his job than was the architect of a quarter of a century ago. He knows not only the ordinary rudiments of his calling, but he has a higher conception of, and a firmer grasp upon, the specific thing he is called upon to do.

Then, too, the architect who engages upon the planning and construction of a school building is no longer a detached contractor who merely performs his work in a perfunctory way, draws his compensation and passes into oblivion again. He comes to the school authorities, moreover, in the capacity of an intimate coworker and advisor. He recognizes that his professional prestige is more dependent upon the future serviceability of the structure than mere ornateness, and that perfunctory service alone cannot win for him the satisfaction that must come through a project thoughtfully planned and skillfully executed.

Such planning contemplates a due regard not only for the specific objectives fostered by the school, but takes into account location and environment as well. There are physical considerations which arise with every new project which do not constitute an exact duplication of a similar project elsewhere. The judgment of the architect and intimate knowledge of the situation, as well as the testimony of the school administrator, must come into play in solving the particular problem.

If, on the whole, there has been a decided advance in schoolhouse planning, aside from the closer adaptation of a structure to wider school operations, it must be found in the fact that the made-to-order schoolhouse plan has given way to the professional architect, who is also a student of modern educational effort and obligation.

Those engaged in any discussion of the subject must proceed not only with a full appreciation of the achievements in the field of school architecture, with an appraisement of what is expected of the architect who plans and constructs school buildings, but also with full knowledge of what the school administrator must know and exact. They must proceed upon the thought that the country in which we live considers the housing which is provided for its children during their school hours as one of the prime essentials in its system of popular education. The physical surroundings which attend both pupil and teacher have a direct bearing on the quality of the education that is dispensed.

The mission of the modern school architect will be to serve all those who are entrusted with the task of providing the American youth with schoolhousing that shall not only be in keeping with the essentials of such housing, but that shall also be in keeping with the dignity and prestige of the great Republic, whose stability and perpetuity must be found in an efficient system of popular education.

PRISON-MADE FURNITURE AND SUPPLIES FOR THE SCHOOLS

The effort on the part of some of the states to employ their prisoners in the manufacture of school furniture and supplies is not new. Those concerned in the rehabilitation of the derelict are convinced that a humanitarian approach to the problem of promoting the physical and mental suffering of such derelict requires wholesome employment, which thus enables him eventually to be restored to society. Their claims cannot be denied.

The subject has been discussed in these columns in recent years, and we have no quarrel with kindly disposed people who manifest an interest in those who crowd our prisons. Such interest deserves our admiration. The manner of solving the problem, however, not only involves the interest of convicts, but also the rights and prerogatives of a free people who obey the laws of society. There are equities which those concerned in the welfare of such convicts cannot ignore. It may be difficult to employ the prisoners without setting them in competition with free labor, but it cannot be said, that it is well to engage in the production of articles which tend to dignify the prisoner in the minds of the school children of the land. Such a course is both undesirable and unnecessary.

The rising generation must be taught to respect honest labor. One of the finest things in the educational life of the nation is found in the vocational schools which teach an interest in the process of production and stimulate a pride in the finished article. These schools make for character building and useful citizenship. They dignify the factory chimney and walls and inspire admiration for the tools and machinery manipulated by skilled men who are not only useful citizens but also law-abiding and respected members of the body politic.

In contrast to this conception of American educational influences we are confronted with the attempt to surround the school child with equipment and paraphernalia that breathes the atmosphere of the prison and thus exalts the convict and his handiwork. The child mind is

bound to imagine that some brutal figure has evolved the trappings of the classroom, some hands that perhaps have committed a bestial murder have fashioned the school desk occupied by the pupil, or the same fingers that have made the school paraphernalia have manipulated a robber's gun. Such reminders are not designed to lift the child into an atmosphere of laudable endeavor and exalt the things produced by honest labor. To introduce prison-made articles for classroom use cannot in the nature of things prove either elevating to the pupil or economical from the standpoint of sound and progressive school administration.

A movement designed to accomplish the ends above mentioned have found expression during the present year in bills introduced in the National Congress and in twenty state legislatures. These measures are presented under the guise of a model prison bill. They pretend to give relief to certain industries by prohibiting the manufacture and sale of the prison-made products, but propose that the state shall manufacture all equipment and supplies purchased by the state or any of its political divisions. That necessarily includes the schools.

In discussing the subject of production of any class of articles by promiscuous and unskilled labor it only follows that such production must be standardized in order to permit the requisite economy and the maintenance of an acceptable selling cost. The genius of invention and improvement whereby one article will excel every similar article, and that competitive spirit which from time to time seeks to produce a new and more serviceable article must necessarily be excluded from the labors of a gang of convicts. Mass production and cheapness do not contemplate utility in its constantly changing and progressive features within the walls of a prison.

The productive genius and constructive ability which have made this country powerful and prosperous, and which have been evolved by a free and law-abiding people, deserve continued recognition in the American schools. The modern schoolhouse with its utilitarian equipment and its marvelous educational paraphernalia stands as a living monument to that genius and that ability. It serves as an inspiration to the rising generation in that it has been the recipient of the best contribution which science and mechanical skill could make to the cause of popular education.

It would be just as logical to purchase prison-made furniture and supplies for the American schools as a matter of economy as it would be to buy a piece of jewelry from a jailbird because it was cheaper than that sold by an honest dealer. The dollar mark cannot be allowed to hold sway where principle and moral rectitude are at stake. Nor can the schools tolerate influences which tend to lower rather than to raise the ideals of its beneficiaries.

SCHOOL-BOARD ELECTIONS AND POPULAR SUFFRAGE

The complaint was frequently heard during the present year that popular school elections have been attended with a meager interest and a small vote. The excuse in many instances has been that the candidates for school-board membership were above reproach as to character and ability, and that, therefore, it made little difference as to who was elected. The public remained away from the polls.

Where this situation has prevailed the schools may not suffer in point of administrative efficiency, but, nevertheless, to ignore a school election does not manifest a wholesome community spirit. There is usually a difference between candidate and candidate, and it follows, too, that it is up to the constituency to choose the best.

Some of the communities have been obliged to resort to aggressive publicity methods in order to arouse an interest in impending school elections. Where a proper appreciation of the function of the schools is conceived this ought not be a necessary expedient. Public sentiment should at all times be keyed up to a point where it enters upon a school election with an enthusiastic and discriminating mind.

Many of the societies and clubs that aim to concern themselves with the civic and social progress of the community fail in their purpose in that they hold a meddlesome attitude to a board of education rather than to concern themselves in creating a public sentiment that will lead to the selection of an efficient body.

Here it is not intimated that an organization must become partisan in promoting the interest of favorite candidates, but rather to arouse a sense of obligation to participate in the choice of candidates. To eliminate the unworthy, and to recognize the worthy, is a proper objective, but it is far more important to stimulate a sentiment that will leave every citizen free to exercise his or her choice, than to say who shall be recognized. Where a wholesome sentiment is aroused the results will take care of themselves. In the average community the men and women mentioned for school-board honors are usually sufficiently well known to permit a discriminating voice and vote.

That being true, it does not require a partisan campaign to reach a correct choice, but it requires a reasonably complete expression of the voters to reach that choice. Experience has taught that the undesirable find their way into elected school boards where the voting public has been lax in the exercise of its duties. The unfit may become exceedingly aggressive in seeking an election, while the capable and high minded has believed that the public must be left to its own devices.

It remains, therefore, with the citizenship outside of the several candidates, to stimulate a general interest and to prompt a complete expression at the ballot box. Such citizenship can have in mind only one objective, namely, the physical, moral, and mental welfare of the rising generation. It must proceed upon the thought that the schools are an essential prerequisite to useful citizenship, and that the continued stability and welfare of the nation makes it imperative that every locality, no matter how small, and every citizen, no matter how humble, manifest a deep concern in the cause of popular education.

MODERN MEANS AND TYPES OF SCHOOL PUBLICITY

The expansion which has attended the public-school activities of the United States has also intensified the publicity agencies and instrumentalities carried on in their behalf. The professional publications have undergone a change in that they have become more specialized and in that educational bodies have introduced their own mediums for the dissemination of organization news and the interchange of professional opinion.

The professional publicity engaged in forms one class of publicity while the publicity regarding the schools and designed to inform the general public constitutes quite another phase of the subject. The literature which the schoolmaster brings to the service of his calling does not interest the general public. The latter is not concerned in the discussions engaged in by the educators. The public wants to know in a general way how the tax moneys are expended and what the schools are doing.

The experience of recent years has been to the effect that to hold the schools upon high standards of efficiency, afford commodious housing and proceed toward an enlarged and intensified service, involves a constantly increased public support.

The public extends, in a general way, the necessary school support, but when it comes to innovations and departures calling for heavier taxation, the voice of protest will assert itself. During the past year a number of important school-bond-issue proposals were vigorously voted down, and some of the plans for expansion and improvement were ignominiously destroyed.

In most instances where the public voted negatively on increased financial support the cause was assigned to a lack of intelligent publicity. The promoters relied upon the traditional loyalty of the community, and gave little heed to the backyard gossips who dealt in fanciful rumor.

We recall one instance of a city in the west where a four-million-dollar bond issue met with an inglorious defeat. The school administrators came to the conclusion that the public was uninformed as to the real merits of the projects and, therefore, had approached the ballot box in a spirit of resentment. The board of education had been too close-mouthed and had not even taken the trouble to correct the erroneous impressions which had become current.

In discussing the subject of school publicity, Robert C. Moore of Illinois State Teachers' Association recently held that it is the duty of professional educators to educate the adult public on the problems which confront the schools and the financial support that must be given. He then asks what mediums and types of publicity should be used, and supplies the following answer:

"Our own journals, the official organs of our associations; such publicity is necessary for the education of our own members, if they are to be able to educate others. The newspapers of the state; these are probably the most important broadcasting; this medium is just being developed for our publicity, but a few stations are giving special attention to educational themes. The moving-picture screens, a great undeveloped field that should be cultivated; a five-minute reel or a dozen slides of the right sort exposed each evening or even once or twice a week would produce results in public education through visual instruction. Speeches and addresses: teachers and others interested in the legislative campaign and able to make effective oral presentation of problems and recommended solutions should accept every opportunity to address public meetings, such as Rotary, Kiwanis, Lions, Chambers of Commerce, Women's Clubs, Labor Unions, Parent-Teacher Associations, etc."

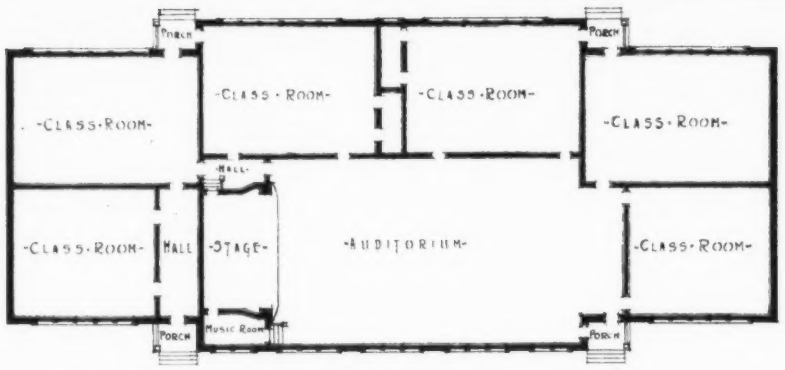
It is gratifying to note the increase in the number of schoolmasters called upon to address commercial bodies, service clubs and the like. The subject usually discussed is the school or some phase along popular educational lines. The schoolmaster should never miss the opportunity to bring the cause of the schools before the community or any fraction thereof.

SCHOOL TAXATION

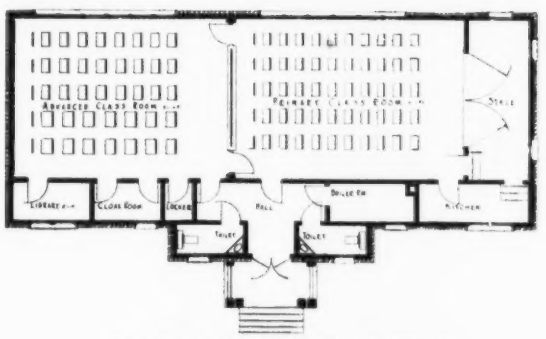
When the tax burdens become too unbearable on too many people in any country or age the ultimate reactions are likely to be disastrous. In the very interest of their own security and the future happiness of their children all should welcome any necessary readjustment in taxation that would make the burdens more even and cause a feeling of fairness to prevail. This is not the usual case, however, and the result is that those in a position to improve our tax laws do not dare touch them for fear of the outcry that will come from those who have not been paying as much under the present system as they will have to pay under a change. It becomes the duty, therefore, of those who are interested in the continuing success of our institutions to preach the gospel of tolerance, of fair play, and of seeking the greatest good for the greatest number.

—J. A. Viele, Olalla, Washington.

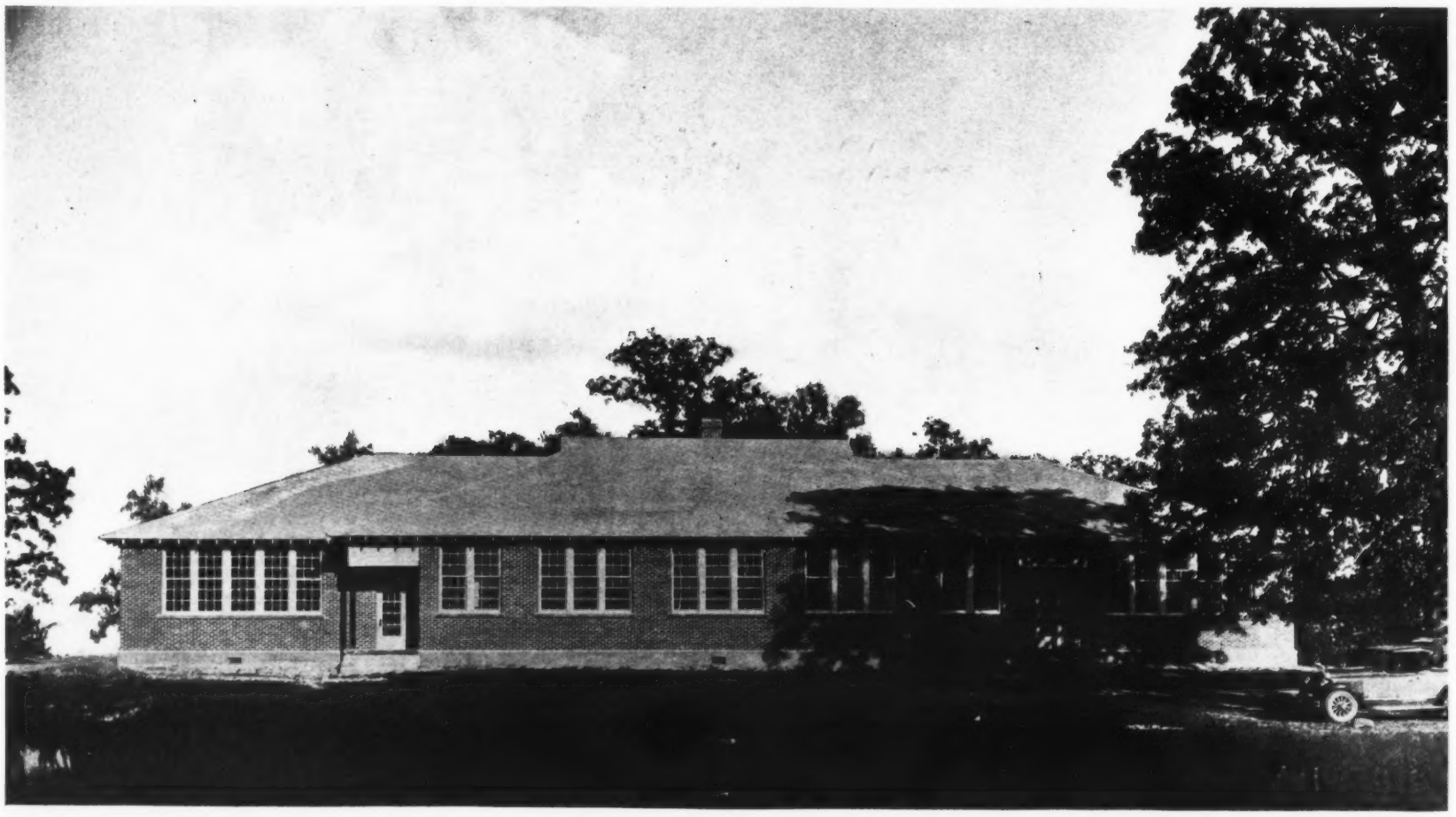
SMITHTON SCHOOL, CLARK COUNTY, ARK.



FLOOR PLAN, OKALONA SCHOOL, CLARK COUNTY, ARK.



FLOOR PLAN, SMITHTON SCHOOL, CLARK COUNTY, ARK.



OKALONA SCHOOL, CLARK COUNTY, ARK.

Low fuel costs per meal!
WITH VULCAN GAS RANGES

Battery of Vulcans in the University Club's kitchen, Boston, Mass.

BOSTON'S new University Club serves 700 meals a day at 9/10 cent a meal for gas. After a year of heavy-duty cooking, its Vulcans have yet to cost the club a cent in repairs. "I wouldn't want a better range than Vulcan," says Chef Vorderer.

New York's famous Racquet and Tennis Club operates kitchens with the same Vulcan economy.

In natural gas fields, or where quantity cooking is all *table d'hote*—i. e., schools and hospitals—Vulcans often cut fuel costs down to 1/10 cent per meal, and *even lower!*

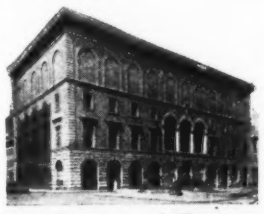
The Fifth Avenue Hospital, New York, serves 2,200 meals daily, averaging 2/10 cent a meal. These Vulcans have been "giving perfect service for six years!" The Harvard Business School's all-Vulcan kitchens prepare 90,000 meals monthly! Each costs 4/10 cent for gas.

Are your fuel costs high? Then try Vulcan's center-fire top with its four-ringed burner that gives perfect heat control.

If you are planning a new kitchen or re-equipping an old, *study Vulcan facts.* Send for Vulcan book. Hotel Dept., Standard Gas Equipment Corp., 18 East 41st St., New York City.

The State Hospital, Denver, Col., feeds patients from an array of Vulcans installed by Public Service Co. of Colorado.

Bellevue and Allied Hospitals, New York City. 11,600 meals a day are cooked on Vulcans installed by Duparquet Huot and Moneuse Co., New York.



The Racquet and Tennis—New York's most exclusive club and exclusively Vulcan-equipped. Installation by Consolidated Gas Co. of New York.

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George Washington High School, New York City. A noon meal for 4,000 students and 150 teachers is cooked on Vulcans. Installed by E. Kronman, Inc., New York.

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WRITE TODAY FOR COPY OF THE DENZAR CATALOG

SCHOOL BUILDING IN ARKANSAS

(Continued from Page 89)

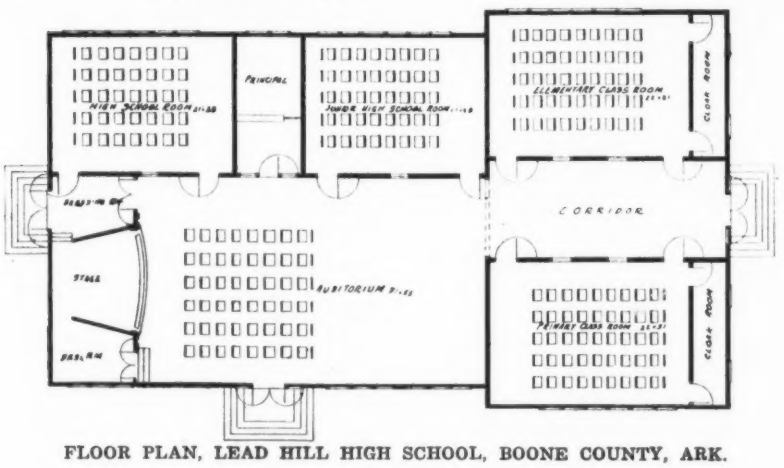
in a way to help rural districts build without exorbitant interest and overhead charges.

Plans of Rural Schoolhouses

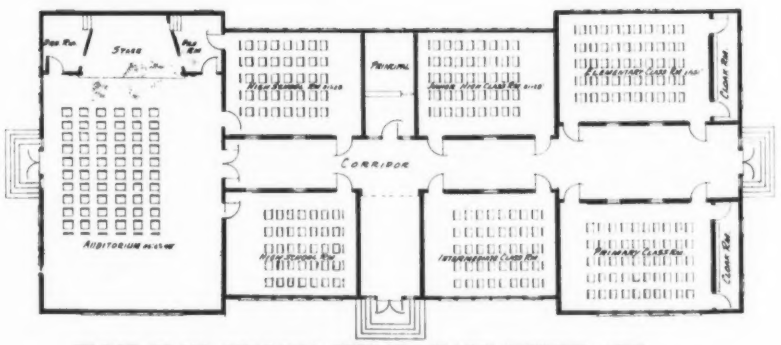
The accompanying photographs and floor plans illustrate representative buildings erected in different parts of Arkansas under the direction of the division of schoolhouse planning and construction. The plans have been developed to meet the conditions that exist in the state, and the schoolhouses emphasize the comfort of the children and convenience for the type of schoolwork carried on. An effort has been made at the same time to provide adequate space in the buildings for community activities. In the smaller buildings movable partitions are provided so that two or more classrooms can be converted into small auditoriums. Provisions are also anticipated for using the buildings for suppers and other gatherings. In many cases the schoolhouse is the only building available for community gatherings.

(Continued on Page 96)

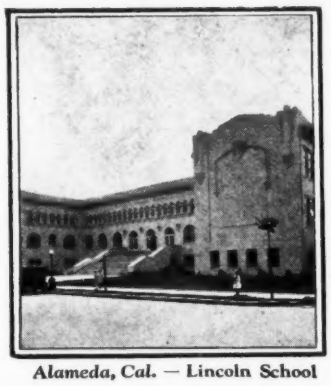
LEAD HILL HIGH SCHOOL, BOONE COUNTY, ARK.



FLOOR PLAN, LEAD HILL HIGH SCHOOL, BOONE COUNTY, ARK.



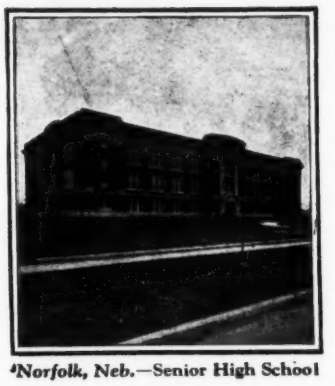
FLOOR PLAN, OKALONA SCHOOL, CLARK COUNTY, ARK.



Alameda, Cal. — Lincoln School

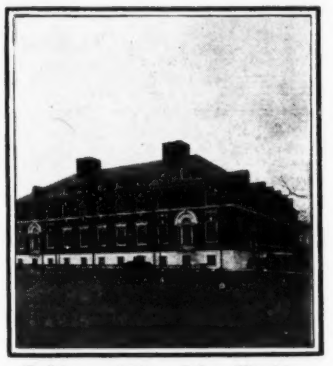
Detroit, Mich. — Roosevelt School

Freeport, N.Y.—Freeport High School



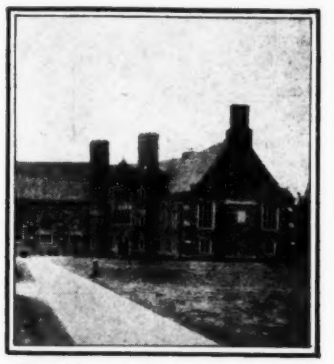
Norfolk, Neb.—Senior High School

Evanston, Ill.—Evanston High School



Baltimore, Md. — Johns Hopkins University

Huntington Beach, Cal. — Union High School



West Chester, Pa. — State Normal School

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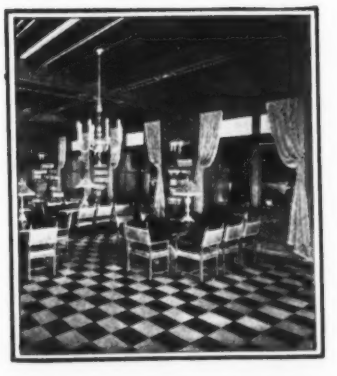
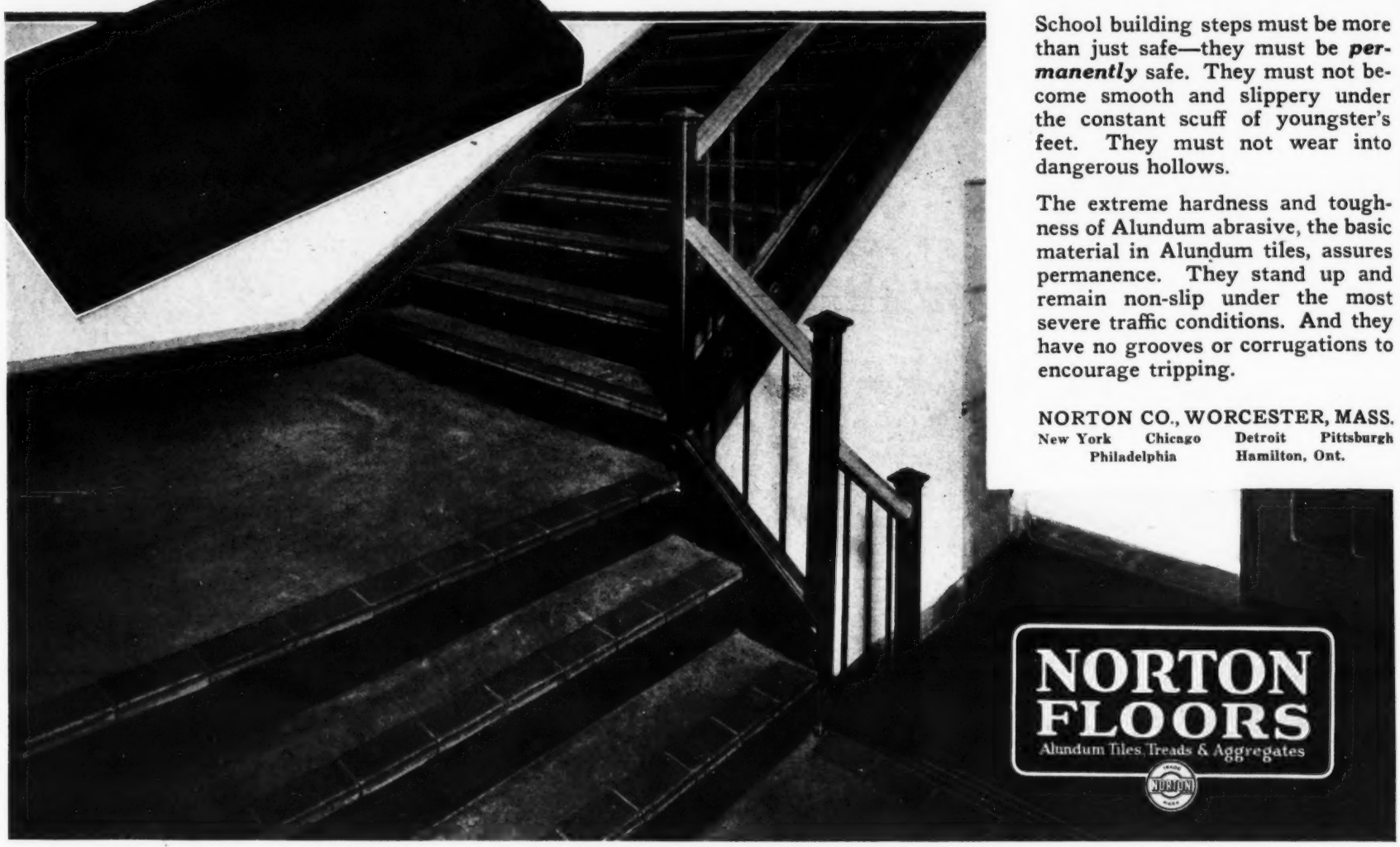


Permanently Safe



School building steps must be more than just safe—they must be ***permanently*** safe. They must not become smooth and slippery under the constant scuff of youngster's feet. They must not wear into dangerous hollows.

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New York Chicago Detroit Pittsburgh
Philadelphia Hamilton, Ont.

(Continued from Page 94)

Some Problems of the Division

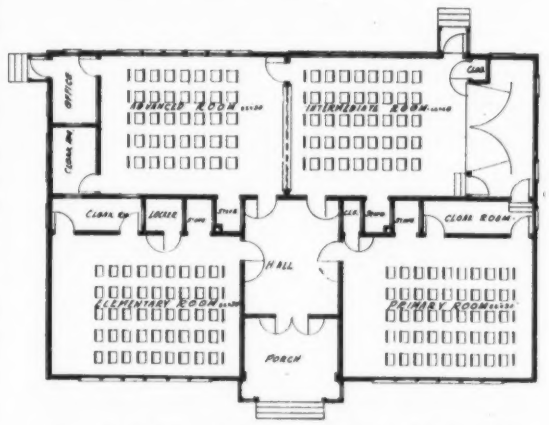
During the first years of its service the biggest problem which confronted the division was to convince school officials that they should use unilateral lighting in new buildings and in old existing structures. The practice in the state from the beginning has been to admit light from two or three or four sides, and it was difficult to make the school officials understand that light from the left side only can be admitted without obstruction or discomfort to the child. Few schools had sufficient light and it was distinctly a problem to make school officials understand that light must be ample as well as correct in direction.

A second problem has been the elimination of awkwardly planned buildings, and the revision of awkward plans involving a waste of

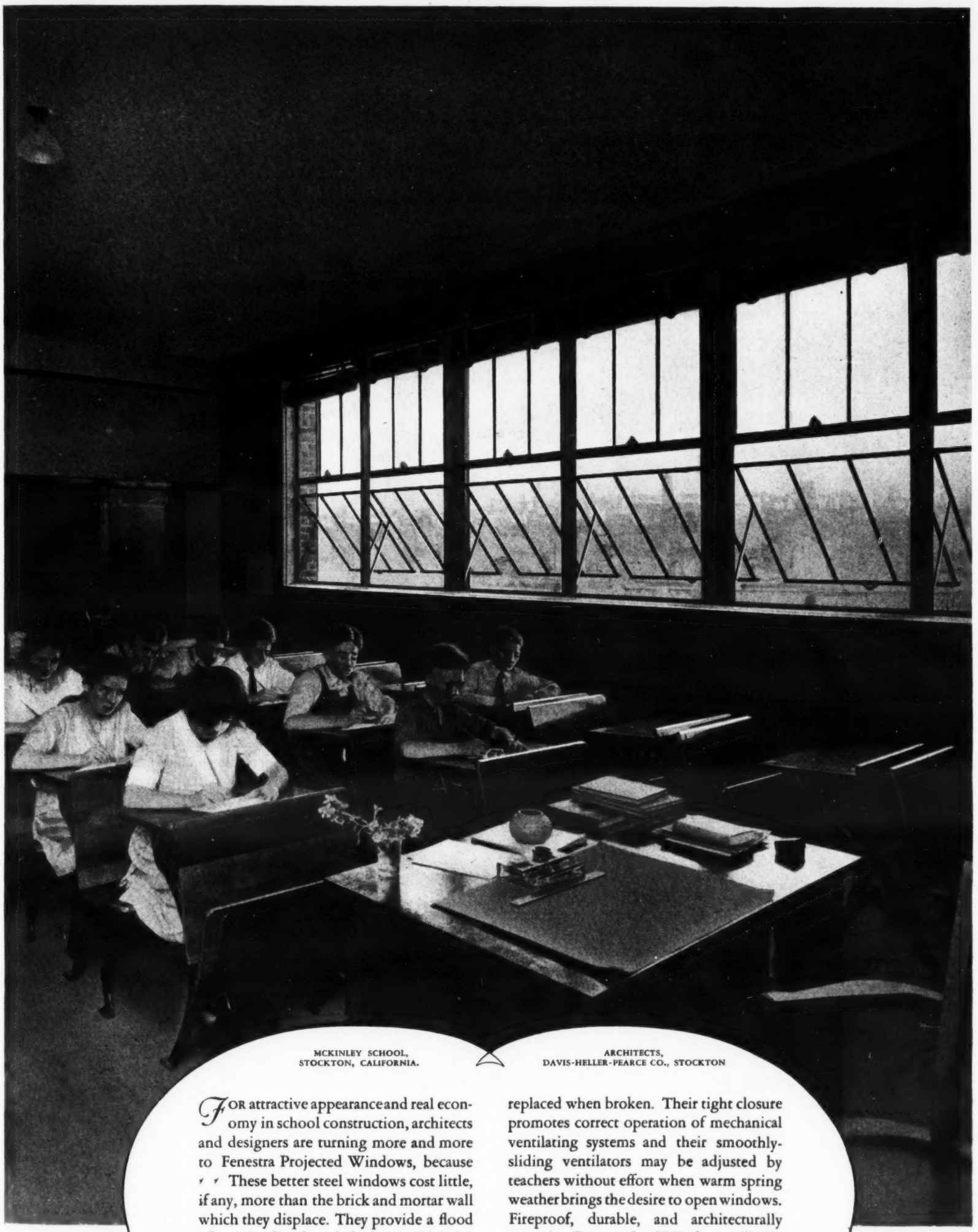
(Continued on Page 98)

OKALONA SCHOOL, CLARK COUNTY, ARK.

PYATT SCHOOL, MARION COUNTY, ARK.



FLOOR PLAN, OAKLAND SCHOOL, RANDOLPH COUNTY, AND PYATT SCHOOL, MARION COUNTY, ARK.



MCKINLEY SCHOOL,
STOCKTON, CALIFORNIA.

ARCHITECTS,
DAVIS-HELLER-PEARCE CO., STOCKTON

FOR attractive appearance and real economy in school construction, architects and designers are turning more and more to Fenestra Projected Windows, because ' ' These better steel windows cost little, if any, more than the brick and mortar wall which they displace. They provide a flood of evenly distributed daylight which increases efficiency and reduces eye strain. Their small panes are quickly and easily replaced when broken. Their tight closure promotes correct operation of mechanical ventilating systems and their smoothly-sliding ventilators may be adjusted by teachers without effort when warm spring weather brings the desire to open windows. Fireproof, durable, and architecturally attractive, Fenestra Steel Windows will give your school a healthier, happier atmosphere at a cost that is surprisingly low.

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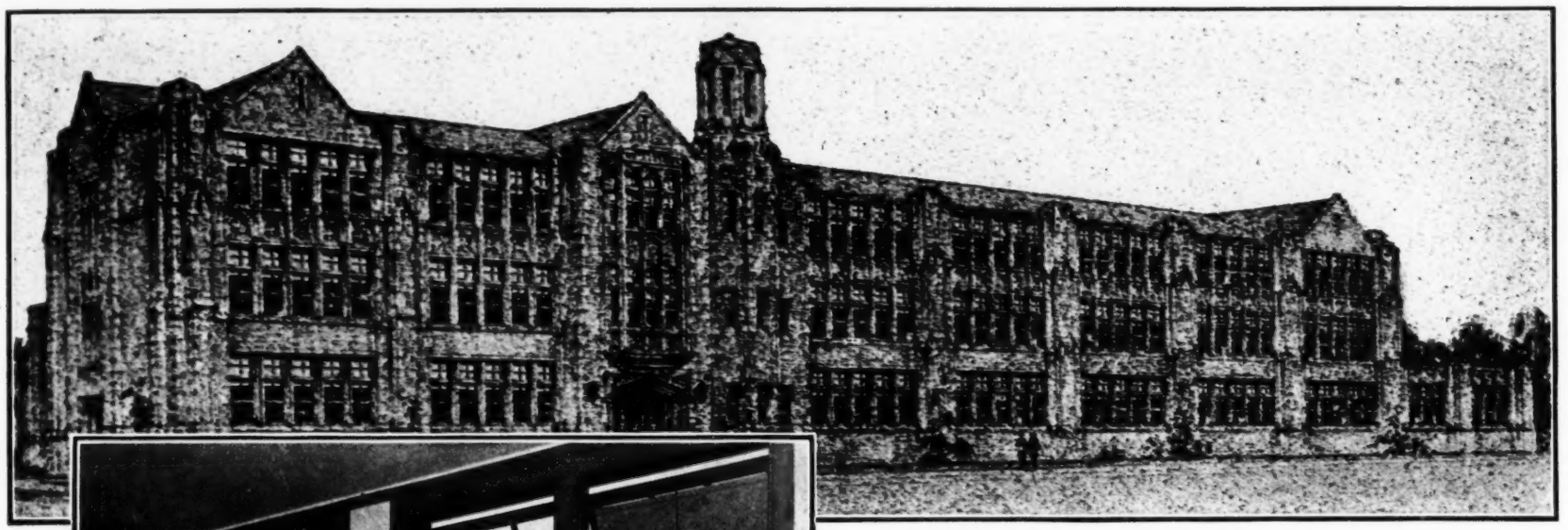

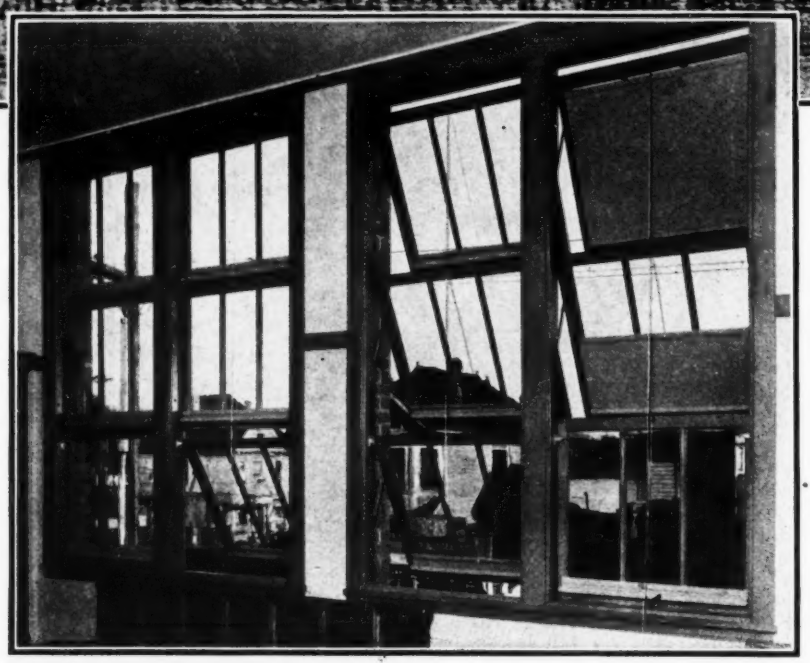

LOWELL JUNIOR HIGH SCHOOL, Oakland, California
HOWARD SCHRODER, *Architect*

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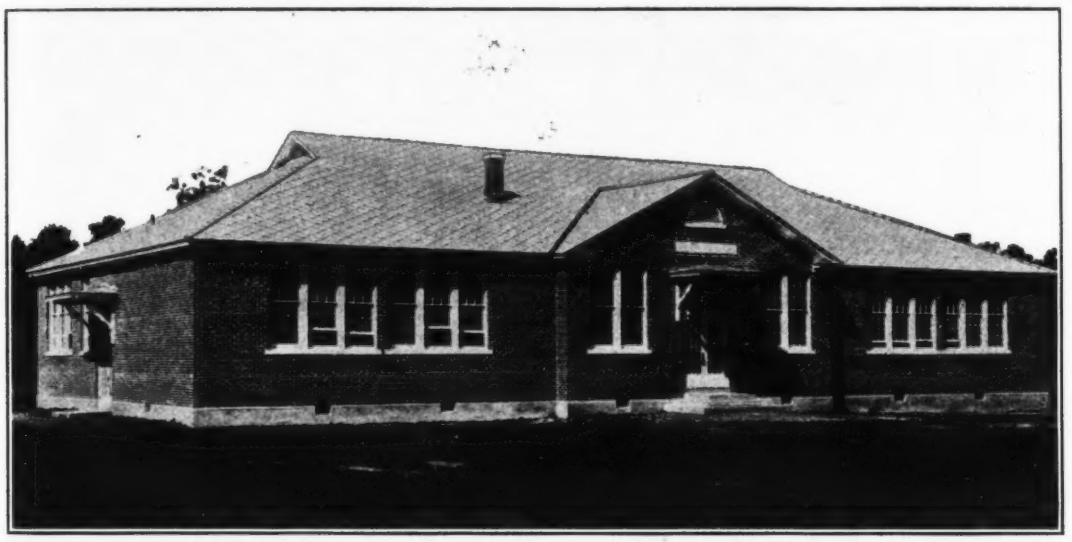
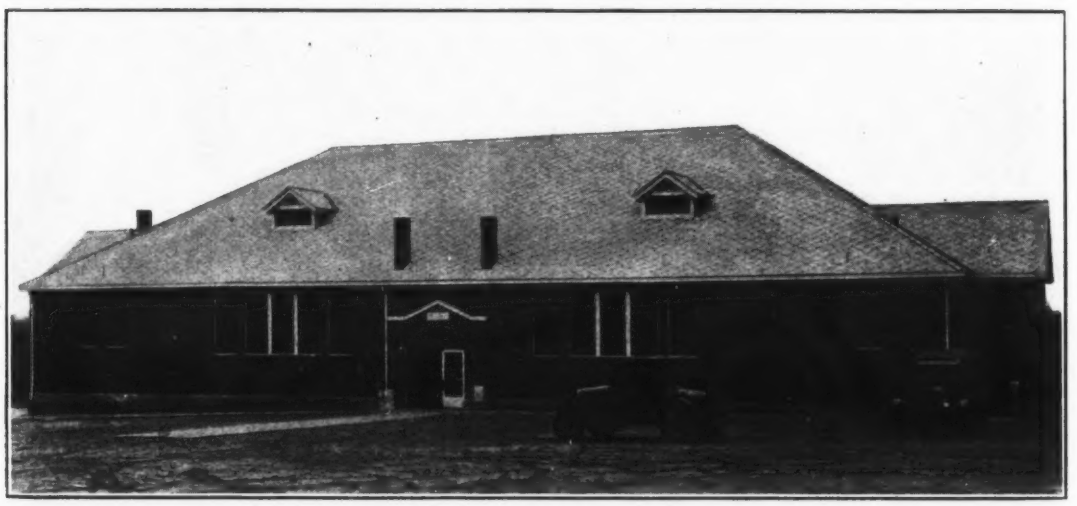


ARTESIAN SCHOOL, CALHOUN COUNTY, ARK. (See Plan, Page 101.)



SANDY LAND SCHOOL, UNION COUNTY, ARK.

(Continued from Page 96)

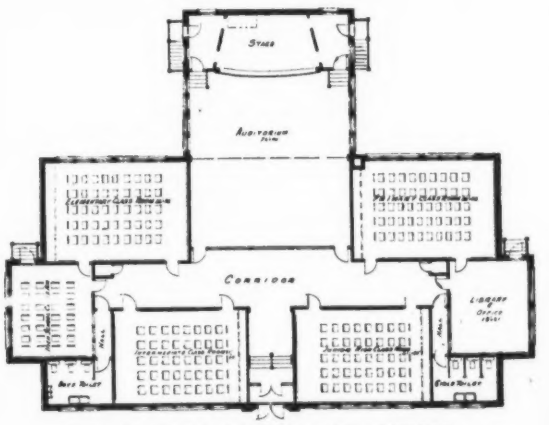
space and a minimum of usable classroom area. The result of a poorly planned building is increased building cost which overbalances maintenance and teacher cost.

A third problem has been poor construction and the selection of inferior materials, resulting in buildings which lack permanence and comfort.

A fourth problem which the division has combated has resulted from bad interior arrangements. It has been the constant policy to prevent the selection of unsuited wall colorings and to insist on the substitution therefor of pleasing colors which provide the proper light reflection. Blackboards placed too high and unsuited interior decorations have been other difficulties to combat.

A fifth group of problems has involved the selection of furniture and equipment for children. School boards have been inclined to buy seats too large or too small, or to place different

(Concluded on Page 101)



FLOOR PLAN, SANDY LAND SCHOOL, UNION COUNTY, ARK.

PLANNED LIGHTING

HOLOPHANE CONTRIBUTION TO SCHOOL EFFICIENCY

The day of the little old red school house is past. And with McGuffy's reader, the book slate and the woodburner, have gone also the old fashions of lighting.

Good modern practice demands that the lighting of schools be planned by engineers of long practical experience in this field.

Planned Lighting is the name we have given to artificial lighting installations, planned by Holophane Lighting Engineers for specific application, and which employ Holophane Specifics (Holophane Symmetric and Asymmetric Lighting units).

Holophane School Lighting Specifics are made of prismatic glass for specific application in class-rooms, corridors, gymnasiums, oratorium and assembly rooms, stairways, and even in the base-ball cage.

Planned Lighting cannot be bought over the counter as "merchandise" any more than a set of architects' or engineers' plans can be so purchased.

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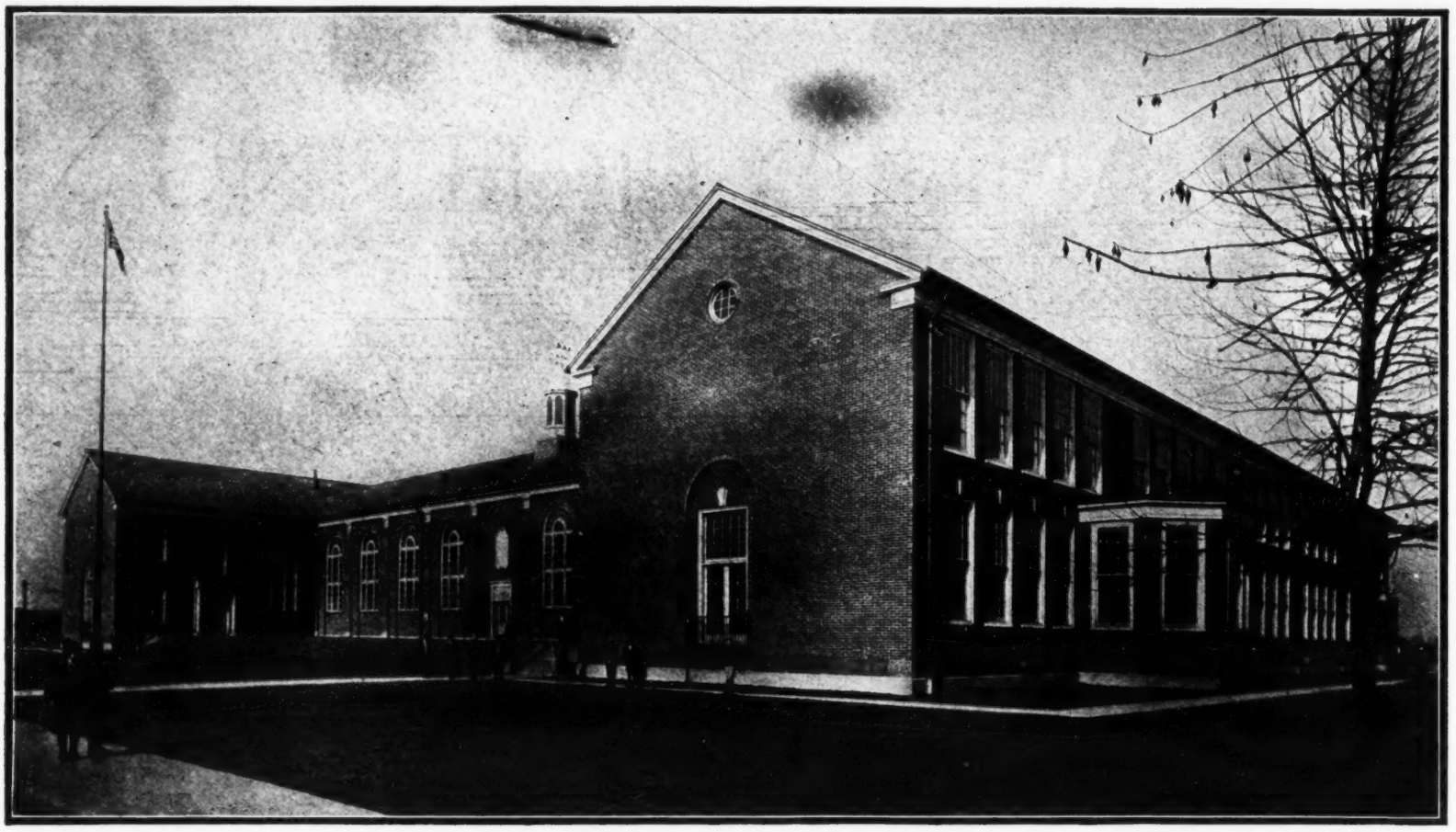

The Daniel Kiser Elementary Junior High School, Dayton, Ohio; Wm. B. Ittner, Inc., St. Louis, Mo., Architect; Paul C. Stetson, Supt. of Schools

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Leaky roofs, leaky plumbing, costly repairs and damage to expensive interior equipment are unknown where Copper Leaders and Down Spouts, Copper Flashings and Brass Pipe are in service.

Attractive appearance and greater durability are insured where Brass or Bronze hardware fixtures are present.

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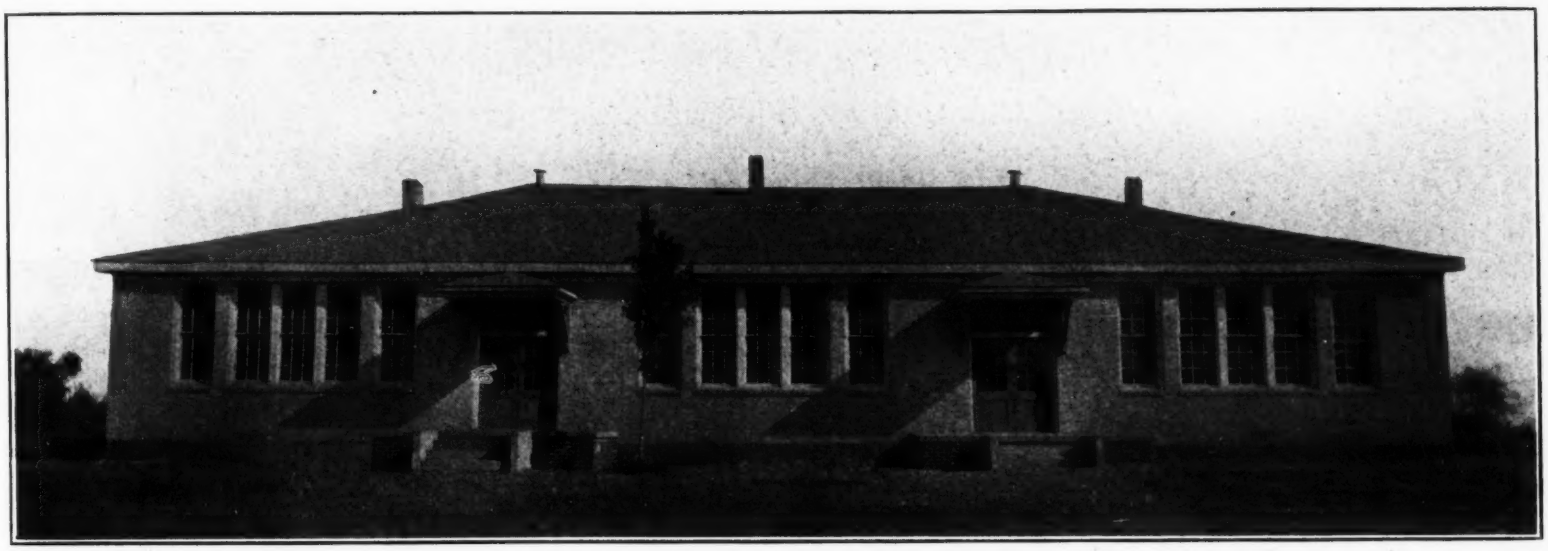
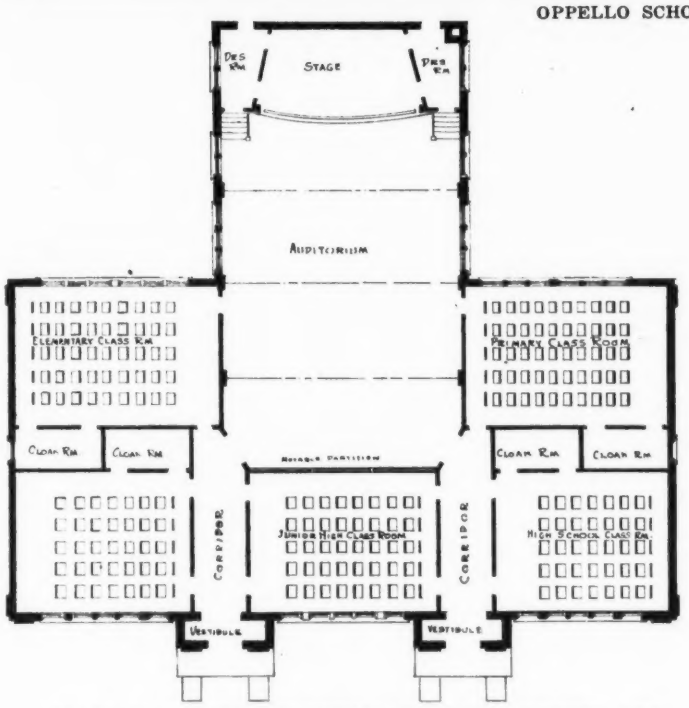
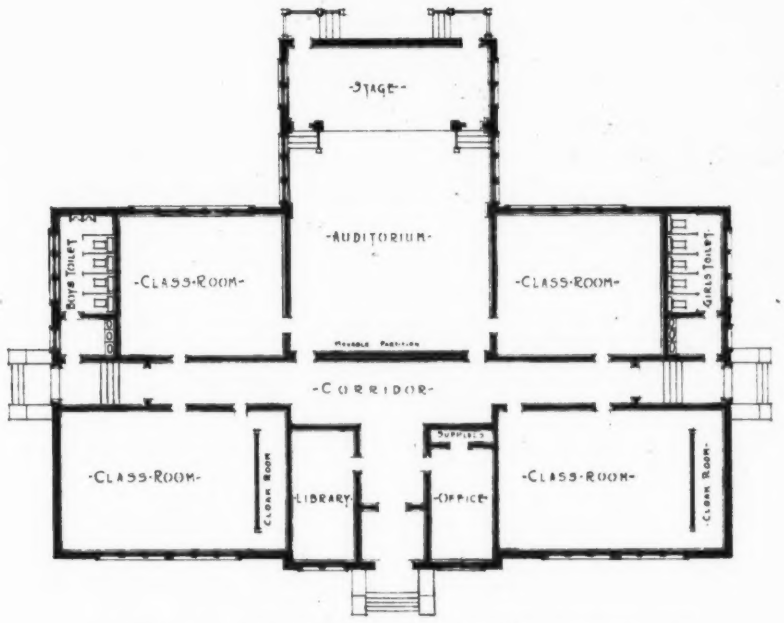


OPPELLO SCHOOL, CONWAY COUNTY, ARK.



FLOOR PLAN, SURRIDGE SCHOOL, RANDOLPH COUNTY, ARK.

(See Illustration, Page 98.)



FLOOR PLAN, ARTESIAN SCHOOL, CALHOUN COUNTY, ARK.

(Concluded from Page 98)

sizes of seats in the same row from front to back. Furniture has been furnished in colors not suited to classroom use, and in some cases even old-time "benches" and equipment have been proposed. In many cases sanitary facilities which are obsolete and dangerous to the health of children have been found.

A sixth problem has related to the selection of adequate sites and the planning of sites. Very often no playground arrangement has been made, and in many cases the school site has been inaccessible or entirely too small in area. The location of school sites sometimes presents difficulties due to local troubles. Many times schoolhouses have not been located properly because owners have refused to sell desirable land.

A seventh problem shall probably always be found: It arises from the fact that funds have been too small adequately to provide for the needs of a school.

A final difficulty has arisen from the fact that districts have been too small and it has been difficult to make consolidations large enough in area. This has increased the per-capita cost of one-teacher as well as of consolidated school buildings.

Two laws enacted by the legislature of 1927 will help to solve some of these complicated problems. A revolving-loan fund will provide a way so that many school districts may build without exorbitant interest and overhead charges. This fund will be used especially in needed consolidations and in centers where adequate school plants can be developed. A second law gives school districts the right of eminent domain and permits the ready purchase of needed sites.

Then and Now in School Finance

Charles Black

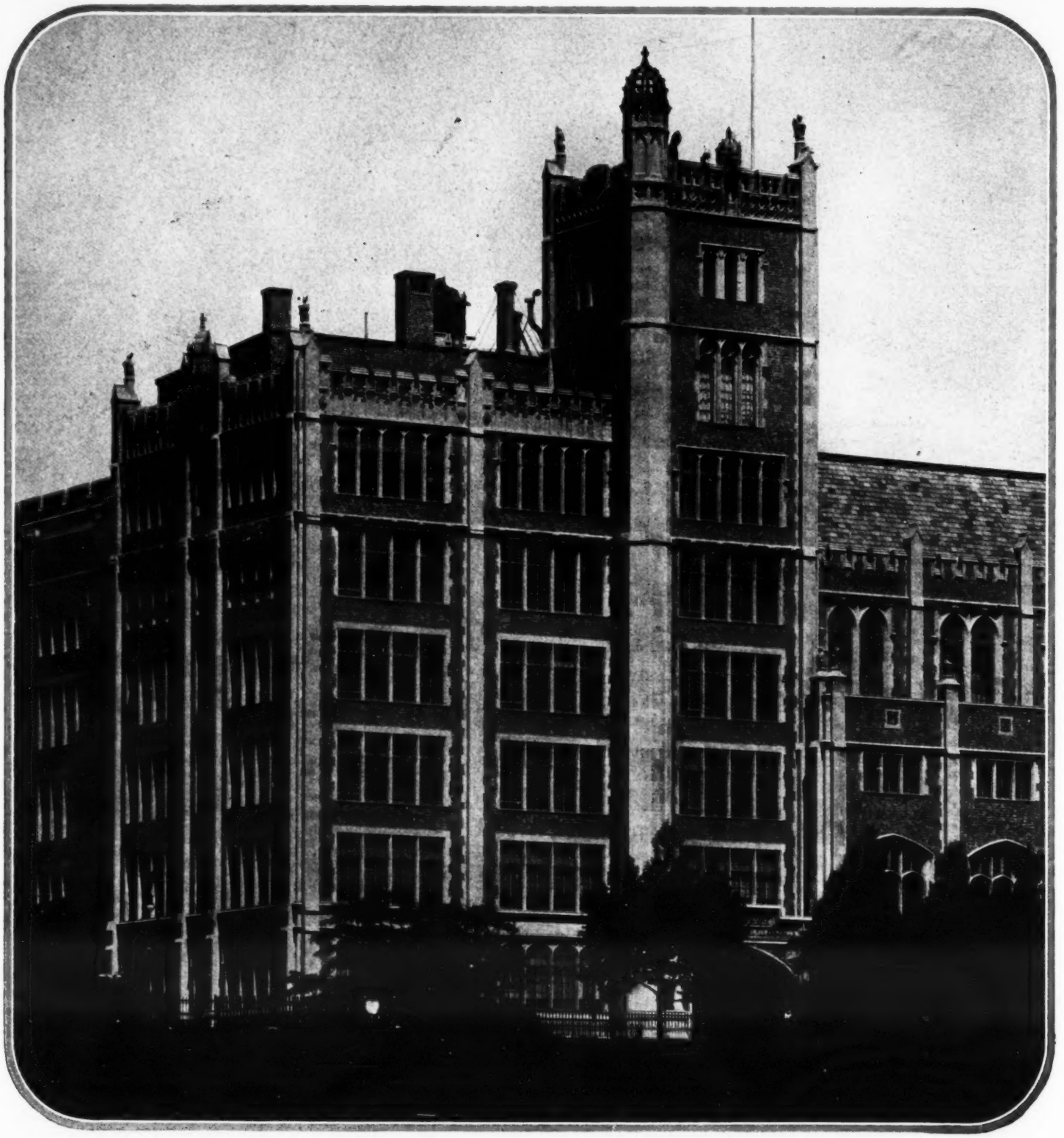
It is fortunate that a much better understanding now exists between municipal officials and municipal investment bankers. Money is cheaper to municipalities and, while profits to dealers have shrunk to a small fraction of former profit per thousand, under present existing methods dealers are able to transact a tremendously greater volume of business at a proportionately decreased cost. Fifteen years ago five millions of dollars was considered a large annual volume of business for a municipal-bond dealer. A yearly business of forty millions of dollars is not unusual in recent years. One concern with a million dollars capital in a recent year bought and distributed over $75,000,000 of county, school, and city bonds, at a gross profit of $405,000, or less than three quarters of one per cent—and this was *gross profit*. The net earned of the capital stock was less than $175,000—under one quarter of one per cent of business volume—but a return of over 17 per cent on invested capital. There are few other lines of business conducted on this profit margin, but at the same time there are few businesses whose capital is always invested in such safe and readily marketable securities.

When communication was much slower than at present and when the usual school official was ignorant of general financial conditions, bonds were usually sold on the first offer. In states outside the banking centers there were usually two or three brokers who bought bonds to resell to New York and Chicago bankers for final distribution to investors and institutions. Many of these local brokers had little if any financial responsibility and, if unable to resell the securities at a profit, would refuse to accept the bonds and would give as a reason some technical excuse of proceedings irregularities. Their contracts to purchase were, when analyzed, usually nothing more than an option to purchase and were often subject to the approving opinion of "our attorney" or "our counsel" who might be anyone which occasion demanded. About this time "pools" were not uncommon, and many bonds were awarded on supposedly competitive bidding to a combination of brokers who later divided the profits.

The sharp practices existent in the bond business at that time were not entirely the fault of brokers. Many municipal officials insisted on the payment of "commissions" to local banker and attorney friends. When necessary the bond dealer paid, after making sure the "commission" was paid to somebody who held no official position. He did not worry as to the final disposition of the money—he was within the law.

Public interest in municipal affairs has been increasing, and this has been particularly true

(Concluded on Page 174)



New York Training School for Teachers, New York City. Wm. H. Gompert, Architect. Indiana Limestone trim.

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Entrance, Millburn High School, Millburn, N. J. Guilbert & Betelle, Architects. Illustrating the pleasing effect possible by the skilful use of Indiana Limestone in conjunction with brick.

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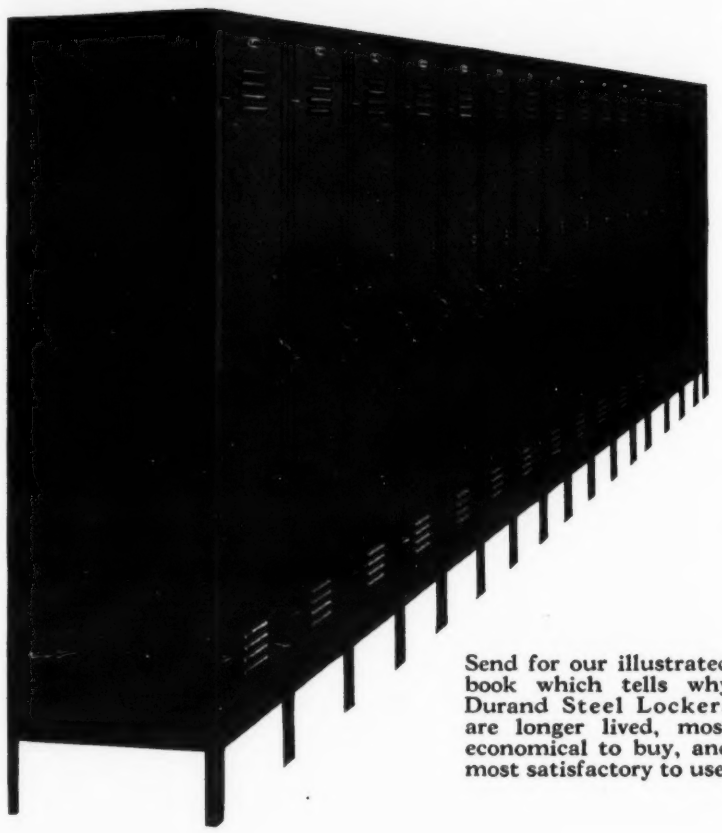
"Red" Clinched The Title!



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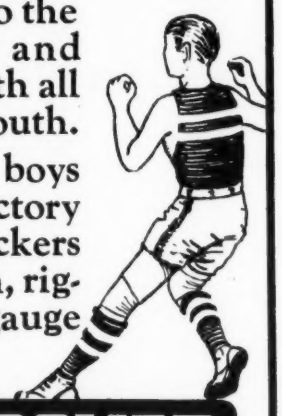
"Ted to Jimmie to Red"—the same combination that kept the team in the running all season, won the title after trailing throughout the first period and almost to the final whistle.

Then, a thousand husky school boys crowded into the locker room, kicking and pounding the lockers with all the vigor of healthy youth.

But—a thousand school boys celebrating an athletic victory can't damage Durand Lockers because of correct design, rigid construction and 16 gauge doors.



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NEWS OF THE SCHOOL BOARDS

NEW YORK BUSINESS DEPARTMENT CONDUCTED AT REDUCED EXPENSE AND WITH INCREASED EFFICIENCY

Mr. Joseph Miller, Jr., secretary to the board of education, New York City, in his annual report to the board of education, shows that the business office has been conducted at a reduced expense and with increased efficiency.

Mr. Miller reports that efforts to reduce the amount of printed matter in the Journal of the board have resulted in a volume of 2,266 pages, or 432 less than that for 1925. The reduction was made possible through the inclusion of several items under one resolution.

The filing of old records in the basement of the hall of the board has been begun with the aid of modern filing equipment. All unnecessary documents will be destroyed as soon as legal permission has been obtained.

A new looseleaf edition of the board's bylaws has been issued, making it unnecessary to paste new sections over revised bylaws, and permitting the exchange of old pages for new. In the binder are included the important decisions of the state education law, charter provisions pertaining to the board of education, and a list of other provisions and laws applicable.

A new system of recording the punctuality and attendance of employees insures a permanent service record for each employee.

ECONOMY AND EFFICIENCY AS FACTORS IN THE BUSINESS ADMINISTRATION OF SACRAMENTO PUBLIC SCHOOLS

The old adage of "a penny saved is a penny earned" has never been applied more faithfully than it is in the daily conduct of the public schools of Sacramento, Calif., where the board's rule of economy with efficiency is adhered to by all school officials.

The matter of placing a requisition for supplies is not a mere formality in the school department. The requisitions from the various principals are sent to the administration building where they are checked over. Each Wednesday afternoon, Supt. Charles C. Hughes, Business Manager W. E. J. Woodburn, and Asst. Supt. Overturf meet as a committee to inspect the requisitions.

The requisitions are carefully checked over again, the pertinent need of the material asked, and the status of the available funds considered. If the requisition passes the scrutiny of the board, then the material is supplied. If the material is not in stock, the business manager calls for bids, and the result is that favorable prices are obtained by the board.

A constant guard is maintained against waste by any school. The needs and consumption of material by one school are measured against the supplies used by another, all the time the average daily attendance is taken into consideration. If a large school has demonstrated its ability to get along efficiently on a certain amount of supplies, then it stands to reason that the other schools are able to do so.

Old material taken out of buildings is not thrown away but is salvaged for future possible use. Recently a radiator was needed in a room at the administration building and the business manager utilized one which had done duty in another building.

At the present time the business manager is purchasing pencils at jobbers' prices, which is accomplished through competitive bidding. In bidding for supplies, everyone is given a chance to bid upon supplies and there is keen competition.

Just recently the city schools purchased 97 new typewriters for the high school, paying $11.20 apiece for new Underwood machines. The old machines, which usually bring $20 or $30, were turned in on new ones, and only $11.20 additional was paid for each new typewriter.

The school desks and chairs were made by the school shops, and it is estimated that a saving of forty per cent is made on each desk. These shops are not handled by student workers, but are operated by the business department who employ regular journeymen as workmen.

By checking every item used, and by buying at the closest margin, the schools have been able annually to save a large sum of money to the taxpayers. Each year the schools turn back into the county treasury a large sum of money which has been saved out of the regular school budget.

NEW YORK SCHOOL BOARD TO REFORM SCHOOL LUNCH SYSTEM

The New York board of education has instructed the committee on finance and budget to reconsider a plan for organizing the school luncheon system which was recently criticized. The action is the result of a recommendation of Mr. Arthur S. Somers, chairman of the committee, who asked that a further study be made of the problem.

The committee will ask the board of estimate for a special appropriation for placing the luncheon system on a sound basis. An appropriation of $10,000 will be necessary to equip ten lunchrooms and to put into operation a plan looking to the substitution of a board for concessionaire service throughout the city.

THE PURCHASE AND DISTRIBUTION OF SCHOOL SUPPLIES

A discussion on the selection, purchase, allotment, and distribution of school supplies, was recently presented at an educational gathering by Bert Van Slyke, secretary of the board of education at Sioux Falls, S. Dak.

Mr. Van Slyke notes at the outset that conditions vary considerably in the several communities in that one city has access to local dealers, and the other has not; one school system maintains storage for a year's supply, while the other buys in small lots. At the same time he finds that the subject of school supplies has received considerable attention in recent years.

"The present method of teaching and the revived curriculum have added many and varied activities for which supplies must be selected, purchased and distributed," he says. "The problems confronted in the performance of this task are many and complex and those who are the active agents in this important work should be fully capable of making the proper selection, in order that the best progress may be made by the pupils; should be fully capable also of purchasing to the best advantage in order that there may be no waste of money, and a system of deliveries should be provided which will insure the schools

(Continued on Page 106)

The Foundation of all that is Safe and Healthful in School Construction!

PROPER planning — the foundation of all that is safe and healthful in school construction — is evidenced by the constant recurrence of the phrase "Truscon or equal" in an Architect's plans and specifications.

Light and Air

Proper planning understands the irreparable harm caused by poor lighting and improper ventilation and eliminates these barriers to the child's progress and future by specifying—

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for sunlight without glare and ventilation without draft.

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Proper planning seeks permanence and fire-safeness in partitions, walls and ceilings—to safeguard the child, perpetuate and retain the beauty of the building—and consequently specifies—

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the better base and reinforcement for every plaster need.

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Proper planning considers such problems as fuel consumption, radiation and weight of construction from the standpoint of low first cost as well as lowered maintenance costs and so specifies

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(Continued from Page 104)

of a constant and unbroken supply; endeavoring to guard against the schools running short which makes for delayed progress, or of having an oversupply which may result in wastefulness or extravagance in the handing out of supplies by the principal or teacher."

Mr. Van Slyke then calls attention to a survey instituted by the National School Supply Association which covered a list of cities ranging in population from 2,000 to 350,000 distributed over 25 states. This survey reveals the fact that the methods of selection and distribution do not vary much, but that there is need for greater simplification in sizes and quality. In brief, it points out that it would be an advantage to both purchaser and producer, if supplies and equipment were standardized.

It is argued that the selection of school supplies should become a joint action on the part of superintendent, principal, supervisor and teacher, and that the lists enumerating the several items should be prepared with care, providing full specifications and explanations on each item making it possible for the distributor to bid intelligently. Sample sheets of each kind of paper to be selected should be attached to the list, each sheet having written on it the kind, size and color of paper demanded. The quantity is the next factor to be dealt with. Mr. Van Slyke then quotes from the survey as follows:

"In the larger cities the clerk, secretary, purchasing agent, business manager or a committee of the board do the ordering."

"Contracts are awarded in the majority of cases by the board of education except in the smaller cities where the superintendents award the contracts."

"The time of placing orders for school supplies varies from May to August. More than 50 per cent of the largest cities report placing their orders in July. Fifty-six per cent of the cities from 4,000 to 15,000 population report placing orders in June. Towns under 4,000 scatter their orders from February to September."

Following the purchase of the supplies comes the questions of storage and deliveries. Again quoting from the survey:

"A majority of the cities reporting indicate a 'central storage,' this meaning in cities below 15,000 in population a room in the basement of the high-school building; sixteen cities ranging in population from below 4,000 up to 350,000 as using 'school storage.' The system of school storage is not favored, as having a large quantity at hand makes it too easy for extravagant use to be made. In the large cities a central storage building is provided with bins containing supplies and inventory cards attached to the bins showing the quantity of each item of supplies on hand."

THE SCHOOL ROW AT CUDAHY, WIS.

What proved to be one of the most violent school rows of the year broke out at Cudahy, Wis. A citizens' meeting attended by 800 persons broke up in a turmoil, in which some 30 people were injured. Arrests followed.

The story which led to the eruption is an interesting one. During the month of November the school board dropped Supt. Edward C. Seifert, whereupon some 300 pupils went on a strike. The parents sided with the pupils and asked the school board to resign. This the board refused to do. Mr. Seifert, however, brought order into the school when he requested the students to return to their classrooms.

A mass meeting was then called on demand of five taxpayers, by the school board. It immediately became evident that an effort had been planned to pass resolutions approving the action of the school board in dismissing Seifert. The election of a temporary chairman was rushed through before the citizens realized what had happened. The majority board members hurried upon the stage and in an instant the whole audience was in an uproar.

There was a rush of citizens to the stage and in another moment there was a scuffle and a fist fight. Three policemen sought to separate the combatants. Copies of the resolutions were seized. The meeting ended without action.

The matter has now been taken into the courts. While Mr. Seifert will contend that he was unjustly removed there will also be an effort to oust the school board from office.

AMONG BOARDS OF EDUCATION

The board of education of Springfield, Mo., recently held an executive session to consider a bond issue. When questioned by newspaper men about holding secret sessions, Pres. G. G. Lydy said: "If the board cannot have a conference without reporters being present, it is about time to quit."

—Louisville, Ky. The Louisville Board of Education at a recent meeting decided, that in the future, the fall opening of city schools would take place on the third Monday in September, instead of the first. In the past, openings have been from September 2-8, whereas under the new plan they will be from Sept. 16-21, which will result in the opening being late enough to escape the heat waves frequently experienced in the first half of September. This year the weather was so hot that schools were suspended for a week or so, and the parent-teacher and other organizations went on record as opposing the early start.

A revised budget for needs of the schools for the 1928-29 season was increased by $600,000 to $3,508,506.

—The board of education of Long Beach, Calif., has taken steps toward the erection of an administration building. The building will be 75 by 150 ft. in size and will be three stories high. The first floor will be devoted to the offices of the supervisors and to a museum of science. The second floor will be occupied by the business department and the rooms of the board of education. The third floor will be given over to the offices of the superintendent and his staff, the directors of special activities, and the teachers' library.

—The school board of Ferguson, Mo., has received a gift of $1,000 from Mr. W. W. Griffith, the interest from which is to be used for supplies for the primary grades. The money is a memorial to Angie R. Griffith, the deceased wife of Mr. Griffith.

—The Associated School Boards and Trustees of New York State held a meeting in Rochester, in October, at which new officers were elected for the year. Mr. H. D. Fearon, Oneida, was elected president; Mrs. Edwina Danforth, Rochester, vice-president; Mr. R. S. Jewett, Mt. Vernon, secretary; and Mrs. E. L. Robertson, Syracuse, treasurer.

—Chicago, Ill. The board of education has adopted a recommendation of Mrs. Hefferan that school clerks now employed, and hereafter to be employed in the schools to assist in clerical work and designated as teacher-clerks, shall be paid at the rate of $125 per month for the summer vacation schools, and $150 per month from the beginning of schools in September, 1927. Pending the establishment of the proper qualifications and

(Concluded on Page 108)

When it's windows you want *consult* LUPTON

THE ROBERT OAKMAN SCHOOL
Fordson, Michigan
Lupton Steel Projected Windows are installed throughout this modern building.
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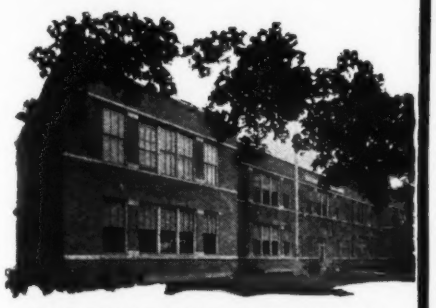
Malow-Barry Co., *Contractors*



THE DELAWARE GRADE SCHOOL
North Tonawanda, N. Y.
In this school Lupton Steel Counter-balanced Windows provide abundant daylight and balanced ventilation.
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UPON YOUR CHOICE of windows for the school depends much of the value of the building and much of the welfare of the people who will occupy it. In fact the windows are so important that they should be investigated from every angle. Appearance, ease of operation, maintenance cost, provision of ample natural light and ventilation are but a few of the factors to be considered.

You will find that it simplifies your selection of proper windows to call in experienced Lupton engineers who will study the individual requirements of your building, and whose recommendations you can accept with perfect assurance.

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There is no charge nor obligation attached to the consulting service of Lupton window specialists. Remember to use this service before you build or remodel.

"Lupton Windows for Schools" describes the several types of Lupton Steel Windows approved for educational buildings. May we send you a copy?

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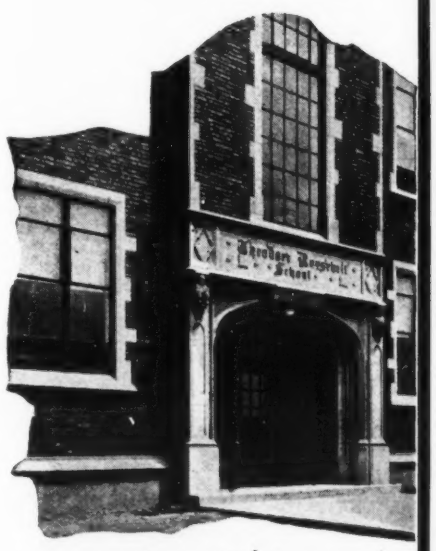

Entrance detail of
THE THEODORE ROOSEVELT SCHOOL
East Chicago, Indiana
This school is also fitted throughout with Lupton Steel Projected Windows.
K. D. Norris, *Architect*
O. H. Hill Co., *Contractors*

A CLASSROOM—ST. RITA'S SCHOOL
Chicago, Illinois
The Lupton Steel Projected Windows used here provide for open windows and easily regulated ventilation even during stormy weather.
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THE DEARBORN HIGH SCHOOL
Dearborn, Michigan
Another beautiful modern school provided with daylight and fresh air by Lupton Steel Projected Windows.
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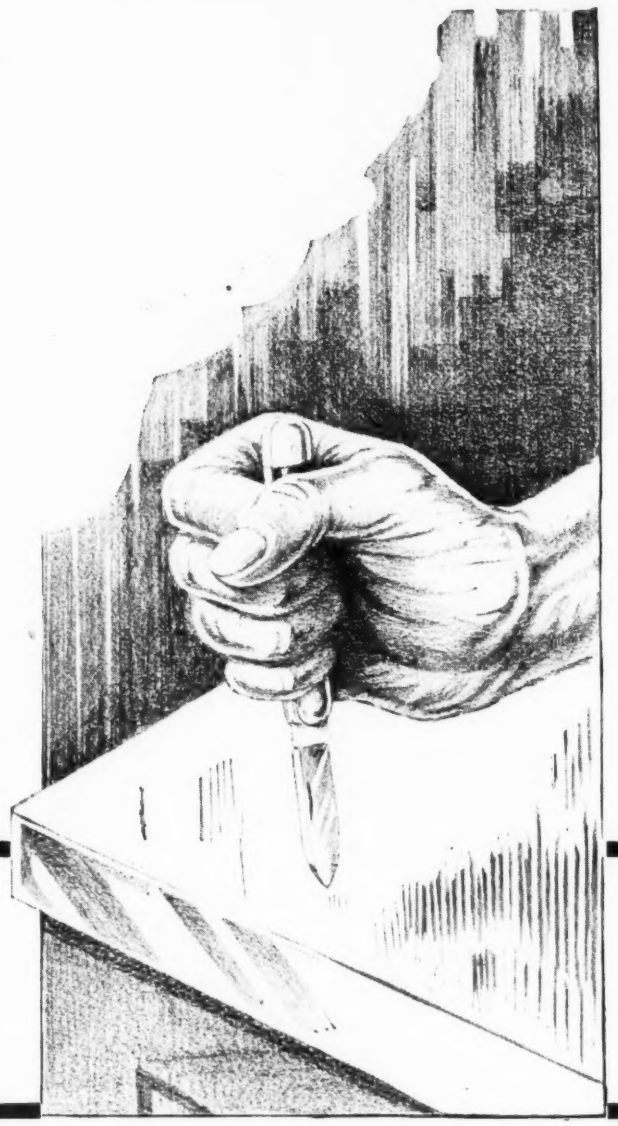
Scouring is never necessary. A sweep of damp cloth keeps Vitrolite immaculate and sanitary. Let us send you complete information and sample which you can subject to your own tests.



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Brooklyn	Detroit	New York	Seattle	Johannesburg	San Juan
Buffalo	Kansas City	Omaha	St. Louis	London	Shanghai
Cincinnati	Los Angeles	Philadelphia	Tampa	Melbourne	Vancouver, B. C.
		Pittsburgh	Washington		

(Concluded from Page 106)

gradings for such positions it has been ordered that these positions be filled from graduates of the Chicago Normal College or those with similar educational qualifications.

—During the last few years the school board of Sacramento, Calif., has maintained its own shops for the construction and repair of school equipment. The school shops recently completed 300 desks for school use, in addition to twenty teachers' desks. An extension of the junior college system has created a good deal of work for the shops since all the lockers, tables, and desks used in these schools have been made at the shops.

—Some months ago the board of education of Fall River, Mass., changed the name of the Durfee high school to that of the Fall River high school. The change became an issue in the recent school elections. It seems that the Durfee high school is the recipient of a $50,000 gift made by the heirs of the late B. M. C. Durfee. No adjustment of the controversy has been reached.

—At Waukegan, Ill., the new athletic field was named in memory of William F. Weiss for many years a member of the board of education. It will be known as the Weiss Field.

—"No school system in a community, large or small, urban or rural, can successfully develop without the help of women on its school board," was the statement made by Mrs. Ernest J. Watt of San Francisco, before a Spokane, Wash., audience.

—The question which concerns the school board of Oklahoma City, Okla., is, "when is a high-school fraternity not one?" President T. E. McGee of the school board, has announced that that body is unalterably opposed to high school fraternities and will expel any member where it is proved that membership is held. The joker lies in the fact that while the membership of the fraternities is composed wholly of high-school students or alumni, the constitutions of the various fledgling brotherhoods have been changed to show that groups shall meet outside of school hours, in homes of the members, and shall not be construed as part of the school activities.

—"As a profession in America, the educators are addicted to movements and waves," said Jesse H. Newlon of Teachers' College, Columbia University, recently. "First it was correlation, a little later motivation, then vocational training, and then the air was filled with educational tests and measurements. Now it is intelligence tests."

—Recent statistics show that nine states in the Union conduct special classes for the care and treatment of defective or special-problem children in the schools. The classes are conducted during school hours and are under the supervision of one or more members of the staff of the state education department. Alabama, Connecticut, Minnesota, New Hampshire, New York, Ohio, Pennsylvania, Wisconsin, and Wyoming are the states which have reported the inauguration of such service during 1926.

—The newspapers of Lexington, Ky., were called into service recently to keep pupils in touch with their teachers during a wholesale quarantine due to infantile paralysis. The newspapers entered into the arrangement willingly and devoted the needed space for the announcement of lessons to the waiting boys and girls.

Parents and pupils cooperated with the school authorities in keeping up the work. A worth-while result of the experiment was a more intimate understanding on the part of the parents with regard to the operation of the schools and a more sympathetic relationship.

—The board of education of Minneapolis, Minn., has adopted a policy that junior high schools be limited to 1,500 students.

SCHOOL BOARD CONVENTIONS

—The School Directors' Association of Lewis county, Wash., elected as its president, C. P. Fulton of Chehalis, Charles T. Riff of Nesiku as vice-president, and Mrs. Jessica McKenna of Chehalis as secretary.

—The Illinois State School Board Association at its recent convention, denounced textbook wars in the following language: "In view of the unfortunate impression that the public may have regarding the purpose and the general operation and administration of public schools resulting from the present Chicago episode, it would seem a matter of justice to education in our state and country that recognition be taken of the destructive policy now being pursued on the apparent basis of personal ambition. Therefore, be it resolved that the Illinois State School Board Association and the City Superintendents' Association of Illinois strongly express our feeling that education should not be handicapped by political tampering in which the welfare of boys and girls in the schools is subordinated to personal or political prejudice and ambition."

—A county school-board convention was held in Manistee, Mich., called by A. J. Dahlgren, county commissioner of schools. The delegates were particularly anxious to secure information on recent school legislation.

—A meeting of the Cass County School Directors' Association was held at Casselton, N. Dak. The speakers were Mrs. Kate T. Dawson, member of the Casselton school board, Miss Georgiana Lomen, director, Moorhead State College, Miss Caroline J. Evingson, county superintendent, Prof. P. J. Iverson of the N. Dakota Agricultural College. Pres. H. B. Cross of Mapleton presided.

—The school-board convention of Walworth county, Wisconsin, was held at Elkhorn with George S. Dick of the state department in charge. The speakers were: Miss Cornelia Van Coy, director of public nursing and others.

A. M. Price of Elgin, has been elected president of the Kane, Kendall and McHenry County, (Ill.) School Officers' Association. Other officers named include: Robert Peterson, Oswego, first vice-president, succeeding A. E. Price, Kendall county; Mrs. Richard Curry, Aurora, reelected secretary, and Seth E. Peck, Geneva, reelected treasurer. Members of the association composed the elective school officers of the three counties, such as boards-of-education members, school trustees, directors and the like. School administrative officials such as superintendents, principals and the like are associate members of the association.

NATIONAL FIRE PROTECTION ASSOCIATION WILL HOLD MEETING AT ATLANTIC CITY, N. J.

The National Fire Protection Association will hold its annual meeting May 7, 8, 9, and 10, at Atlantic City, N. J., at which time the members will listen to the reports of the 32 technical committees on current activities which have been studied by these committees.

The summary of activities and subjects under the jurisdiction of the several committees includes automatic sprinklers, blower systems, building construction, dust hazards, electrical code, electric power house, electric-railway car houses and cars, farm fire protection, field practice, fire pumps, flammable liquids, gases, risks and special hazards, walls and partitions, safety to life, signaling systems, and combustible fibers.

AVENUES *of* HEALTH
in the *Smethwick School*

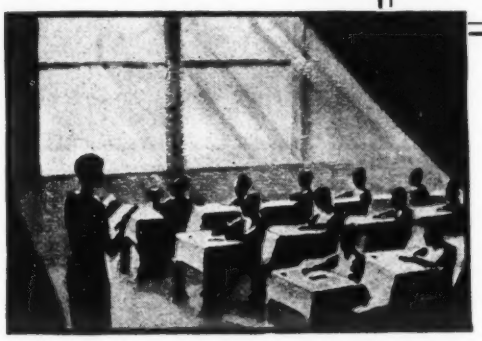
How VITA GLASS, a remarkable new window glass, helped to increase weight and height and to improve health of students in English school

Class in Vitaglazed room	*June 1, 1925*	*March 31, 1926*	*Average Gain*
Average weight	67.90 lbs.	74.01 lbs.	6.11 lbs.
Average height	54.06 inches	55.92 inches	1.86 inches

Decrease in percentage of absences.....5.51%

Class in room with ordinary panes			
Average weight	60.04 lbs.	62.87 lbs.	2.83 lbs.
Average height	51.78 inches	53.31 inches	1.52 inches

Decrease in percentage of absences.....1.78%



Vita Glass in the windows of this schoolroom would assure the passage indoors of the vital, health-giving ultra-violet rays which exist in sunlight, cloudshine and skyshine.

AN English scientist made an amazing discovery. He found that a window glass could be made which would transmit indoors the vital ultra-violet rays of daylight shut out entirely by ordinary glass. In Vita Glass he gave to schools a means of bringing to pupils these rays, which build stronger, healthier bodies, stimulate physical and mental activity, and thus make better and happier pupils.

In June, 1925, a most convincing test of the value of Vita Glass was started in a school in Smethwick, England. A class of boys between nine and eleven years was placed in a Vitaglazed classroom. A second class of the same age, and the same mental and physical character, was put in an adjoining room in which windows held ordinary glass. The heights and weights were taken at the start of the test and again at the end of ten months.

The results were astonishing. Pupils in the Vitaglazed room gained an average of 6.11 pounds against 2.83 pounds in the other class. The gain in height was 1.86 inches against 1.52. Absences due to illness were greatly decreased in the Vitaglazed room.

VITA GLASS

Each pane is cut to size, etched with the name Vita and bears the trademark label.

Just one more example

Other schools are proving even more convincingly the ability of Vita Glass to bring indoors to growing bodies nature's most effective tonic. With Vitaglazed windows school children need no longer suffer the devitalizing effects of being shut indoors for many hours a day, winter and summer, untouched by the vital ultra-violet rays which exist in sunlight, in cloudshine and skyshine, and which the medical profession and scientists say their bodies need so badly.

Try Vita Glass in your school. Test the results as the Smethwick School did and prove its value for yourself. Vita Glass is clear window glass . . . no different in appearance from the glass you now use . . . as easy to install as were the ordinary panes. Its slightly higher cost is more than offset by its health advantages.

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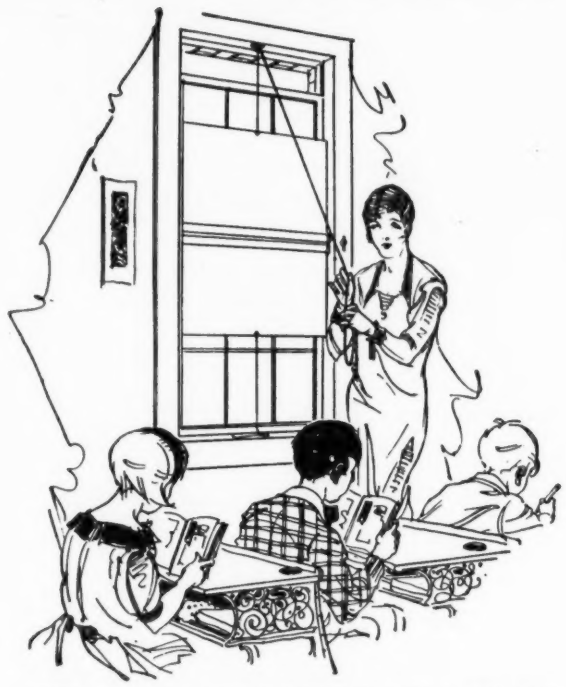

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Make your classrooms attractive and cheerful by installing up-to-date window shades throughout the school. Maxwell shades are made in varied types to suit every modern school design.

We feature "LIFETIME" Canvas, a specially woven material, which is as nearly indestructible as cloth can be made. It gives a soft diffused light and at the same time, permits the passage of sufficient air to insure proper ventilation.

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BUILDING NEWS OF THE SCHOOLS

THE PLANNING OF SCHOOLHOUSES IN CALIFORNIA

When the last legislature of California passed the schoolhouse-planning act for the state schools, creating a department to check plans in all areas outside of the larger cities, their purpose was to create an agency which would eliminate unnecessary waste in school buildings, see that the plans expressed educational ideals, and the buildings, culture and refinement. The department was left free to set up its own rules and regulations.

Mr. Andrew P. Hill, Jr., chief of the division of schoolhouse planning, Sacramento, in a recent issue of the *Sierra Educational News*, describes the basic program which was adopted by the division in order to make the work of the division of the maximum assistance to school systems throughout the state. Mr. Hill writes as follows:

The Control of Planning

Our policy is to deal with fundamental principles affecting the child's health, the administration and supervision of the building, the fitness of the plant to function educationally, its circulation and safety, and its cultural atmosphere. Our progress in educational planning to date has consisted of gathering up good ideas from the place they originated, and introducing them to the profession.

Every architect and educator about the country has been largely free to work out his particular problems. This has allowed for original thinking, with an accompanying flood of new ideas, from the various communities in which they originate. To preserve this dynamic approach, our department enunciates principles only, and publishes plans only to illustrate one or more methods of enunciating various principles.

Where the Old System Failed

Under the old system these principles were too often lacking. Sometimes an architect who was none too thorough, efficient or reliable, would cut his price to a board administering a small rural school. The board may have been uninterested, or not willing to consult the teachers, or dominated by a lay chairman who *thought* he knew something about education.

Even when the teacers were consulted they sometimes did more harm than good because they "rode a hobby," overstressed some principles to the detriment of others, were inexperienced and had little to offer, or could not think successfully in planning terms. The result, too often, was money misspent on a building that could not be a successful school.

At the present time the division is trying to eliminate the numerous mistakes formerly made by:

1. Advising with the board before the site is purchased or the bonds voted.
2. By consulting with the architect, board and county superintendent while the plans are being developed.

This allows us to assure a site adequate for play area, future growth, and properly located buildings. As the building progresses and the numerous problems, both fundamental and minor, present themselves, the division consults with the agencies concerned, suggesting arrangement, materials and ideas collected from other communities, which may be useful or adaptable to the particular problem under discussion.

Thus, both the architect and educator is brought into contact with ideas to which, under former conditions, he might never have been exposed. The experience of the architect is, in effect, magnified many times. The conception of the educator is broadened so that he becomes a man of larger vision, with a keener insight into his school-planning problems. We believe this is bound to result in better buildings.

Mistakes in Fundamentals

It is interesting to note that the most usual mistakes in plans coming into the office are in the fundamentals. The plans are sure to be fairly adequate in hose reels, drinking fountains, blackboards, etc., but almost sure to fail in certain essentials, such as the position on the site, exposure of rooms, preservation of the administration unit, division by sexes, location and arrangement of toilets, use of the buildings as a community center, inadequate, unsafe, or improperly placed stairs, poor circulation, etc.

When the fundamentals are preserved, school planning becomes more complicated, and deserving of untiring thought and skill. Some of the problems arising are so difficult, often, as to make architects feel a satisfactory solution is not possible. Right here is where our illustrative material comes in, and many times to the surprise of all concerned, we find several successful ways out of our dilemma.

Cooperation is Imperative

The success of our departments' work depends on cooperation from two sources—architects and educators. So far the attitude of architects has been most cooperative. Our profession, on the whole, has worked in sympathy with us, excepting a tendency to be willing to go ahead *before* a thorough and careful study of educational needs has been made.

MR. GOMPERT RESIGNS AS ARCHITECT OF THE NEW YORK BOARD OF EDUCATION

Mr. William H. Gompert, for the last four years chief architect for the New York City board of education, has announced his retirement from office under date of November 23. Mr. Gompert was appointed to the office in February, 1923, following the retirement of Mr. C. B. J. Snyder, who held the office for 35 years.

As chief architect of the board of education, Mr. Gompert was responsible for the design and construction of all the 169 school buildings erected in the last four years, at a cost of $127,000,000. At the time of Mr. Gompert's appointment, the board was about to reorganize the building department preparatory to the inauguration of a $110,000,000 school-building program.

The resignation comes at a time when the board is preparing to undertake a rigid investigation of all school buildings previously built to determine defects and to recommend improvements in design and construction. Since last spring, the administration of the building department has been under investigation by a special committee appointed by the board of estimate, at the suggestion of Mr. Joseph V. McKee, president of the board of aldermen. Early in the investigation a dispute had arisen between Mr. McKee and Mr. Gompert over the high cost of running the building department and the low rate of planning and building schools.

Mr. Gompert has announced his intention of returning to private practice. His office as a pri-

(Continued on Page 113)

Greatest Light Where Most Needed!

The most perplexing problem of school lighting is solved by the Kayline-Radiant Unit. It distributes efficient light over a wider area than any other lighting unit and thereby adequately illuminates every desk in a room.

Each different glass shade used in modern lighting units was designed for a particular purpose — either high efficiency or a definite distribution of light. Both were considered in the design of the Kayline-Radiant Unit.

It attains the greatest (90%) light output of any enclosing globe ever made and this light is diffused through the Radiant glass, flooding a 60° zone from each unit instead of the average 45° zone. This wide distribution creates equal illumination throughout the room and maintains a glareless light at all times.

After most severe tests the Kayline-Radiant Unit was specified and installed in many modern school buildings. Catalogs and complete literature are available. Our representatives will be glad to go over your lighting requirements at any time. Please call upon us for any assistance you require.

THE KAYLINE COMPANY
Manufacturers of Lighting Equipment
Since 1895
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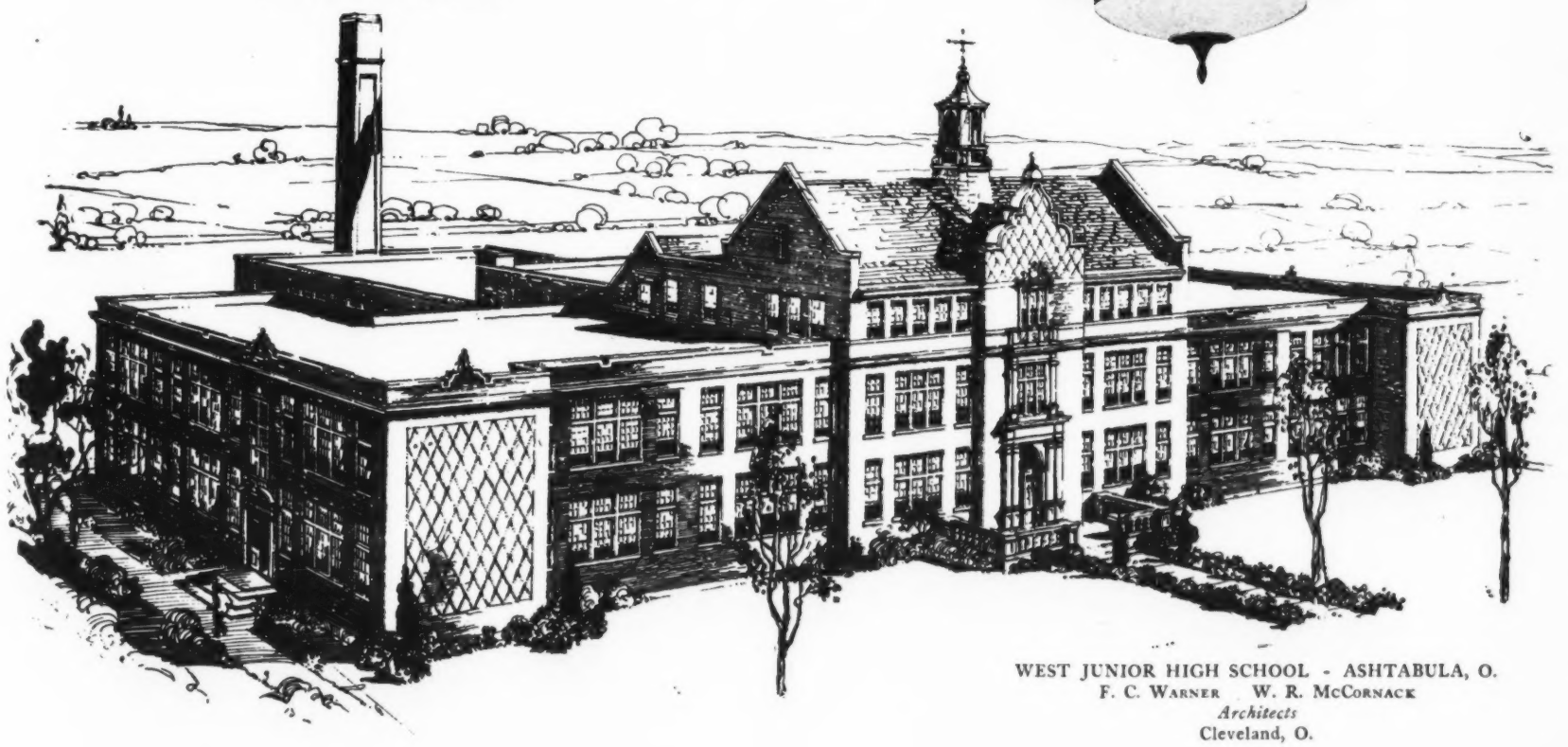
All desks adequately illuminated. No bright and gloomy spots. The Kayline-Radiant Unit provides a soft, yet efficient light over the widest area.



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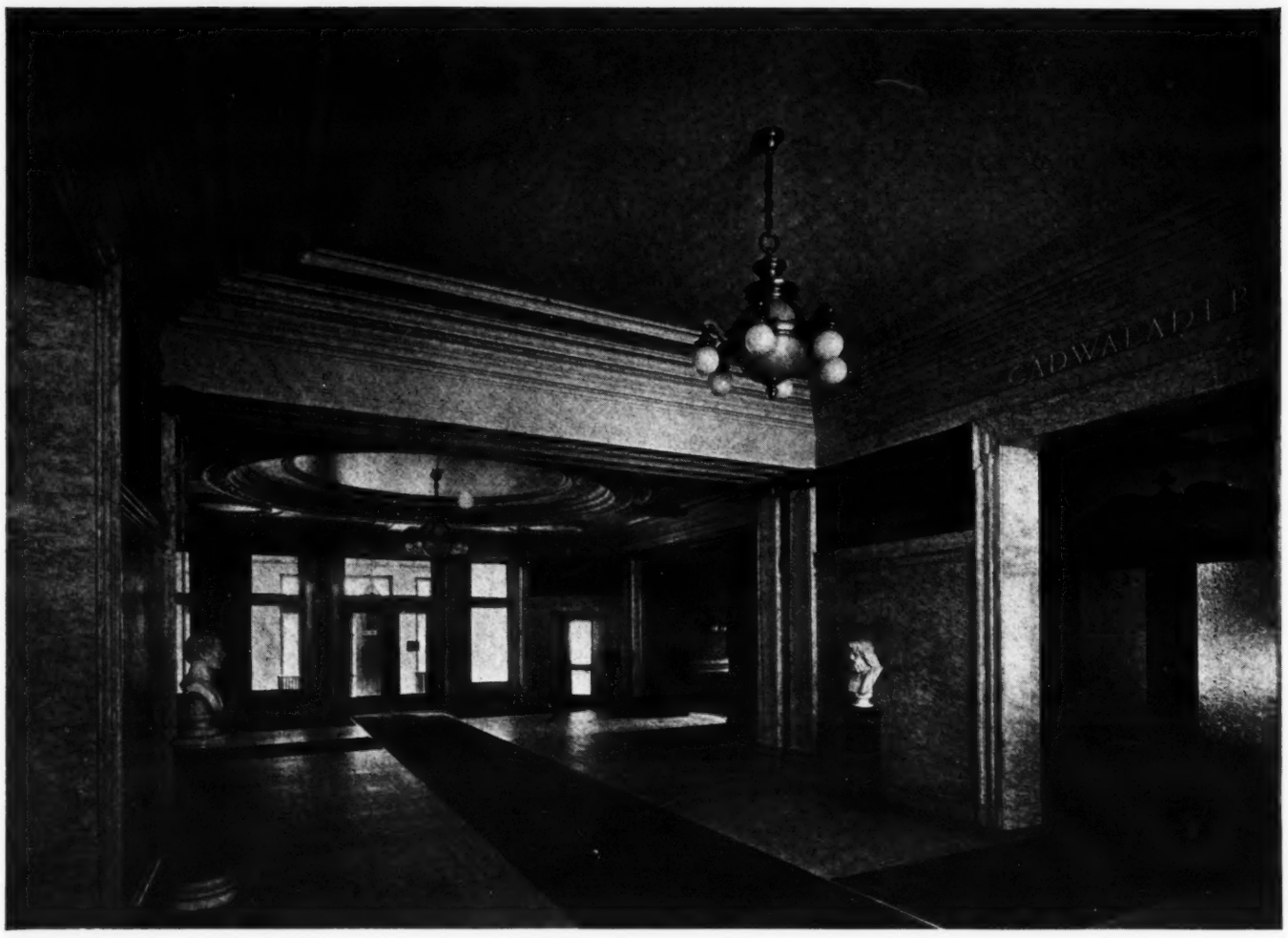

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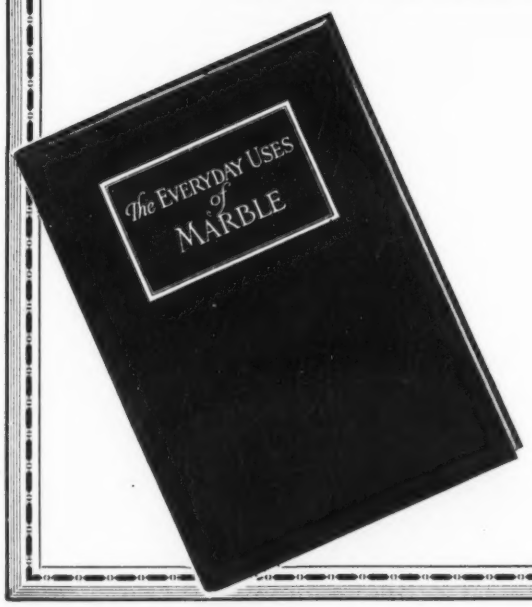

The de luxe booklet, "The Everyday Uses of Marble," shown on the left, is a most interesting presentment—in picture and text—of facts relating to the many practical applications of marble to home and commercial treatments. A copy is yours for the asking —sent upon request, and without obligation, of course. Address Department 10-A.

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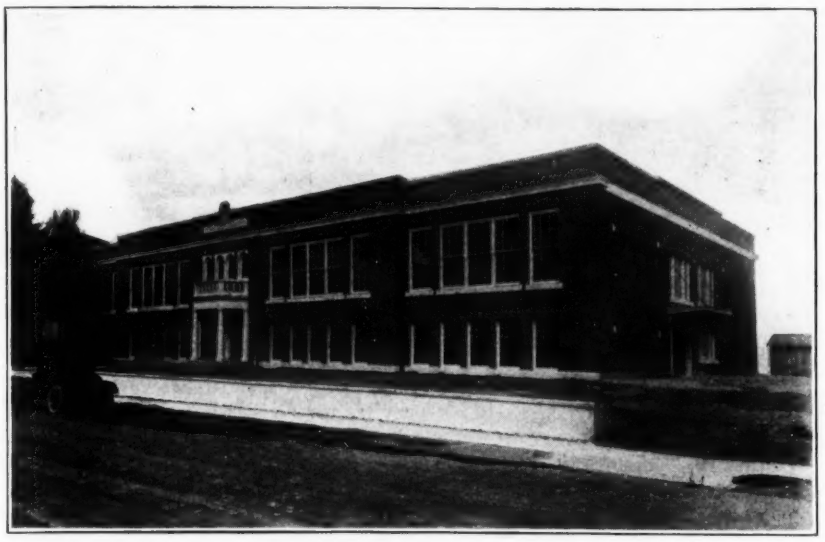

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There is no school building too small or too large for Feralun Anti-Slip Treads. Consolidated and Grammar Schools where very small children are generally found need complete stairway protection both inside and out. Anti-Slip Treads will completely eliminate the possibility of stairway accidents at the entrances and between floors.

FERALUN Style "S" Treads are especially made for schools where foot traffic is heavier than in any other type of public building. The reputation of Feralun Treads is built on SAFETY and DURABILITY which makes their installation one of the safest and soundest investments possible.

There is no good reason known for omitting stairway protection in any school building. It is false economy to leave out Anti-Slip Treads due to the lack of funds as they will add many years to the life of stairs and eliminate repair work in the future.

We will be pleased to mail detail sheets and samples of FERALUN Treads to any school official or architect upon request.

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BOSTON 136 Federal Street | PHILADELPHIA 1700 Walnut Street | CHICAGO Conway Building | BUFFALO Erie County Bank Building | PITTSBURGH Farmers Bank Building | SAN FRANCISCO 444 Market Street

(Continued from Page 110)

vate architect has been for the last four years in charge of associates.

—New York, N. Y. The board of education has adopted a recommendation of President George J. Ryan that the board, with the help of architects, engineers, and the mayor's committee, investigate all schools, with a view of making them one hundred per cent perfect.

Complaints referring to penetration of water during heavy rains and the imperfect working of cesspools in one or two schools in the outlying sections of the city were the reason for the report. The complaints have been referred to the committee on buildings and sites for thorough investigation and report. Mr. Ryan has pointed out that while the board should continue building with that economy which shows due regard for the taxpayers' money, it is also necessary that the board keep the standards at the highest point in demanding thorough construction and assuring absolute hygienic conditions, safety, and comfort for the teachers and children with a guarantee of durability of the buildings.

PROGRESS OF SCHOOL-BUILDING PROGRAM AT FRESNO, CALIF.

Supt. W. R. Hepner of Fresno, Calif., recently presented a report on the progress of the school-building program of the schools, showing the completion of six elementary schools at a cost of $187,341 and two high-school buildings at a cost of $266,691. In addition, there are five schools in process of construction involving a cost of $492,573, and five buildings in course of development.

Of the buildings completed, the new wing of the Heaton elementary school was erected at a cost of $49,214, while the wing of the Columbia school was built at an expenditure of $43,879. In the case of the secondary schools, the Edison high school was erected at a cost of $189,181.

Of the buildings now under construction, the most expensive is the Theodore Roosevelt high school, which will contain fifteen classrooms, a study-hall-assembly room, a number of special rooms, and an office suite and will cost $224,271 upon completion. The Winchell elementary school will contain twelve classrooms, and will be built at a cost of $121,208.

The plan adopted by the board of education for the administration of the building program has proved quite satisfactory. The architects sought to embody in their plans the standards adopted by the board of education upon the recommendation of the advisory committee appointed by the board in December, 1925. The various architects cooperated at all times with the superintendent of buildings and the superintendent of schools in an effort to adapt the arrangement, facilities, and construction of the buildings to the needs of a modern educational program.

Upon Mr. E. J. Farr's able direction as superintendent of buildings, the construction work on the various projects has succeeded on the segregated-bid plan with harmony and efficiency. The buildings standards and legal forms developed by the advisory committee proved to be most useful in the carrying out of the architectural work. A subcommittee of two rendered most valuable service in the checking of all plans and specifications, and many helpful recommendations for modifications, changes, and additions were made to the architects. The offices of the fire-prevention bureau and the commissioner of public works also gave valuable assistance to the architects in connection with provisions for health and safety.

SCHOOL GRANDSTAND COLLAPSES AT RICHMOND

School officials will be interested in a report on the reasons for the collapse of a grandstand at an educational institution in Richmond recently, causing injury to many persons. The National Lumber Manufacturers' Association, which made the report, states in effect that the poor design of the stand, and the entire lack of maintenance, made its early decay and consequent failure inevitable.

In the first place, the lumber used was of rapid growth, and practically all sapwood, without preservative treatment, which decays much more quickly than dense heart pine or fir, ordinarily used for outside structures of this type. If such lumber is exposed to the weather it should be saturated with creosote or other lumber preservatives which costs only a little more and prevents decay.

The posts and timbers were of safe sizes, but no effort was made to protect them against loss of strength by decay. The timbers had not even been painted when the stand was built nor during subsequent seasons. Painting would have made the lumber last three or four times as long, and would have entirely prevented the disaster.

The stand is located on low ground next to the James River, and the lower parts of the structure are reported to be under water for some time every year. The posts which support the stand were carried down into the ground instead of resting on masonry piers. The occasional inundations and the constant dampness of the ground in which the supporting posts rested made a combination for which only creosoted lumber should have been used. Comparing the situation of lumber so used with that of railroad ties on a wet roadbed, it is stated that creosoted ties lasted from 20 to 30 years, where untreated ties were good for only 5 to 10 years.

The initial failure was attributed to the built-up beams which capped the rows of posts and supported the 2 by 12-in. joists carrying the seat banks. These built-up beams were 8 by 12 in. and were made of 2 by 12-in. planks nailed together. Such beams are excellent and economical in buildings, but when used outside, moisture is apt to accumulate in the cracks between the planks and the beam decays more rapidly than one of solid wood.

Making recommendations for rebuilding of the stand, the report says that all lumber must be kept from contact with the ground; that the beams and posts should be of dense strong lumber conforming to the structural grades for Southern Pine or Douglas Fir, or, if sapwood lumber is used, that it should be creosoted in pressure tanks; and that if untreated lumber is used, it must be kept well painted. If these simple precautions are observed, no fear of collapses need be entertained.

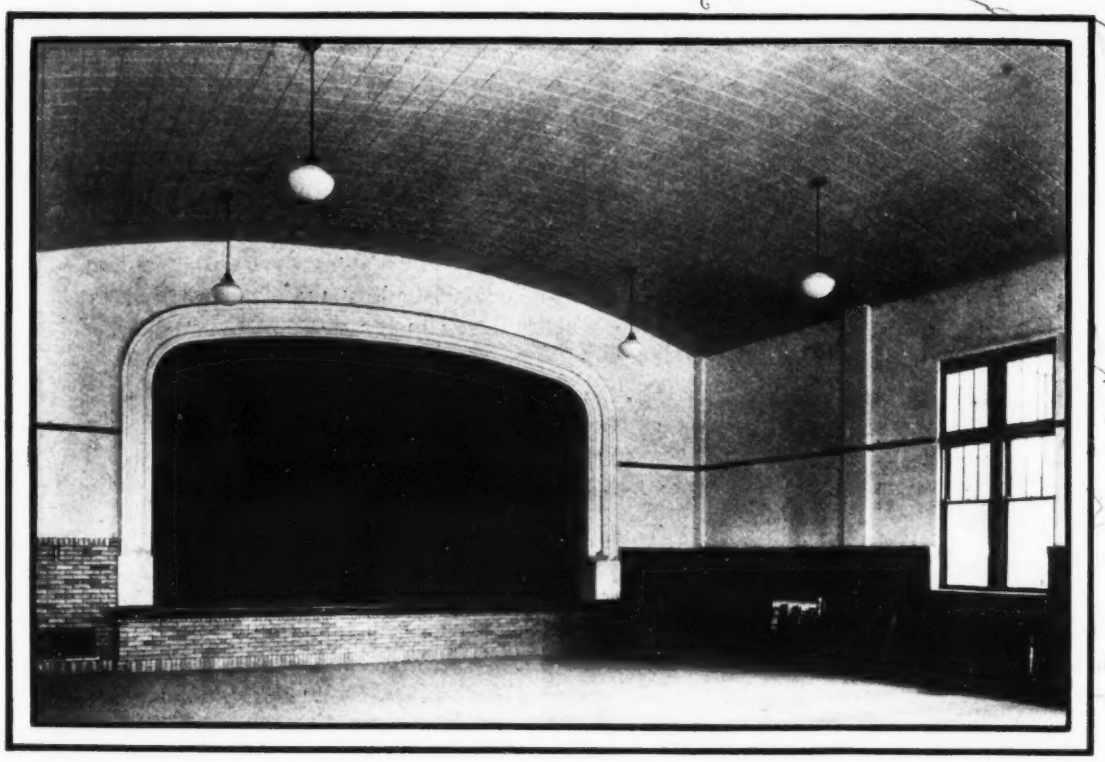
THE COST OF OPERATING SWIMMING POOLS

Swimming pools are generally considered one of the most expensive features of a school building to operate. Few school boards have the courage to face the annual statement of cost of their swimming pools, and for that reason figures are generally lacking that make comparisons possible.

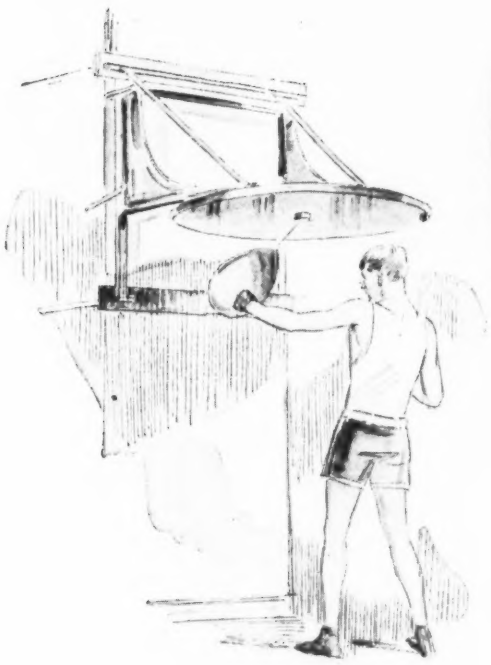
The following is a summary of a report presented by Supt. William M. Davidson, to the Pittsburgh Board of Education. It is based on Pittsburgh salaries and fuel prices and while several elements

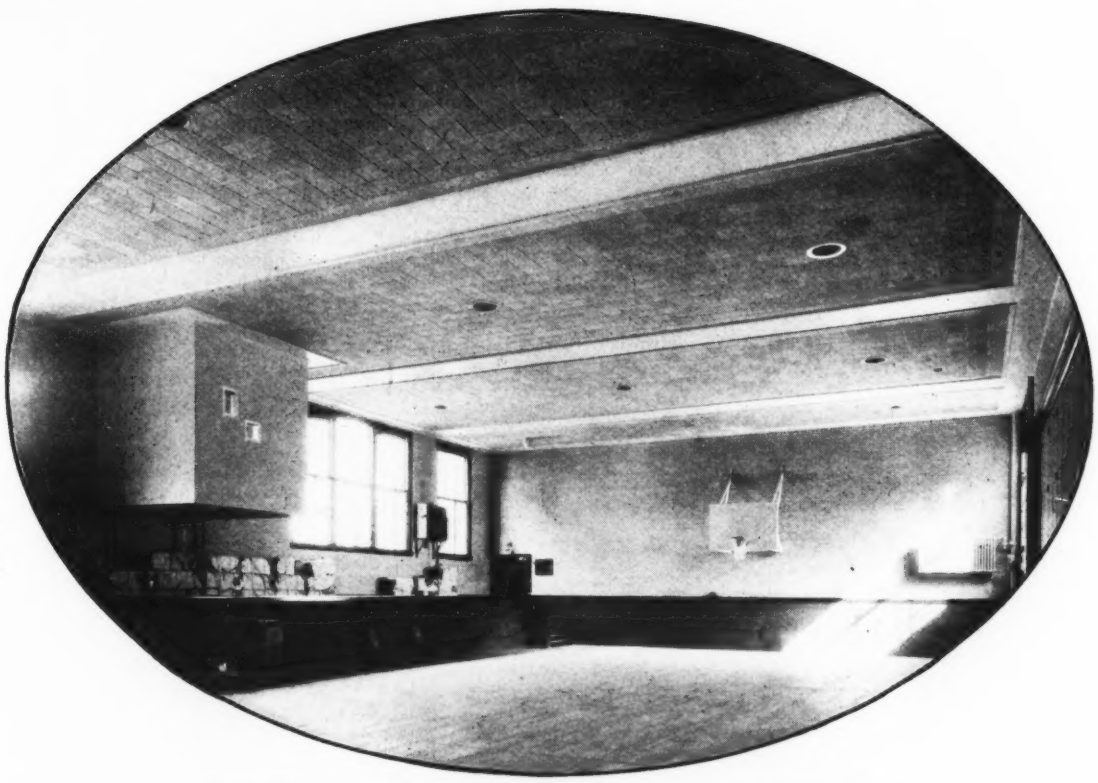
(Continued on Page 116)

Protect *your* from



Auditorium-gymnasium, School No. 34, Indianapolis, Indiana. Because of Acousti-Celotex, plays and operettas can be given in this room without interference from sound reverberations. Acousti-Celotex softens noises and eliminates unpleasant echoes. D. A. Bohlen & Son, architects; Chas. E. Wehr, Acousti-Celotex contractor.





Gymnasium, Beehive School, Warrensville, Ohio. Physical education classes and indoor games are conducted here without disturbing the rest of the school with shouts and noises. These noises are absorbed by the Acousti-Celotex in the ceiling. Fulton & Taylor, architects; George P. Little Company, Acousti-Celotex contractor.

students *Disturbing noises...*

Students concentrate with greater ease and do better work when school gymnasiums, auditoriums and other rooms are quieted with Acousti-Celotex

NOISE is a continually irritating factor in schools. It disturbs concentration and is a strain on the nerves. More than one sensitive youngster has failed in his schoolwork because of this. And noise is equally as hard on the teachers, for it distracts their attention and wears down their patience.

But there is no need of noise taking this daily toll of energy from students and teachers. For by applying Acousti-Celotex to ceilings and walls, you can *quiet* the distracting sounds coming from school gymnasiums, auditoriums and other rooms.

And your school auditorium will be much easier to hear in after Acousti-Celotex has been installed. School assemblies, plays and operettas can be conducted without interference from sound reverberations, making the programs twice as enjoyable.

Acousti-Celotex, type BB, has a sound-absorbing efficiency of 70%—the highest of any material on the market. It is made from tough cane fibres into strong *permanent* tiles. Small openings, drilled *deep* into the tiles, act as minute tubes in carrying sounds to the noise-absorbing fibres *inside*. Because of these deep openings paint on the surface cannot interfere with the sound-absorbing efficiency of Acousti-Celotex. So you can have the tiles decorated in beautiful colors and mosaic designs.

Moreover, the decorating is all done *before* the tiles are applied to the ceiling, thus eliminating all the muss and trouble the painting would otherwise cause.

Acousti-Celotex comes from the factory in finished rigid units that are ready to install. Applying it to walls and ceilings is simple work—no finishing processes are necessary. And you can have it installed in any building, new or old.

Acousti-Celotex now is being used in school auditoriums, corridors, classrooms, shops, gymnasiums, chapels, cafeterias, band and chorus rooms.

The Celotex Company will be glad to tell you more about the color effects you can obtain with Acousti-Celotex. And you will be pleasantly surprised at the smallness of the cost.

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ACOUSTI-CELOTEX

FOR LESS NOISE--BETTER HEARING

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AND yet when you want it, a sound proof air tight partition in a moment's notice. That, in short, is our horizontal rolling partition.

In our half century in business, we have installed nearly 30,000 of these partitions in schools and churches in all parts of the country. And to any one of them we are always glad to refer.

At any time, one of us would be glad to confer with you on the subject of rolling partitions, or our catalogue No. 14 tells the story in detail.

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(Continued from Page 113)

are estimated, the figures are reliable because they are backed by the experience in the Pittsburgh high schools:

Estimated Cost of Conducting a Public-School Swimming Pool

	Without Filtration Plant	With Filtration Plant
Swimming Instructor — (Average high-school salary)	$2.675.00	$2,675.00
Swimming Matron	744.00	744.00
Supplies—(Average per school 1926)	467.21	467.21
Cleaning—Estimated by Mr. Ellis.	255.00	130.00
Heating Water—Estimated by Mr. Ellis	585.00	140.00
Power for Pump—Estimated by Mr. Ellis	.....	130.00
Light and General Janitor Service—Estimated by Mr. Ellis	100.00	100.00
Maintenance—2 per cent on estimated cost of swimming pool of $75,000.00	1,500.00	1,500.00
Interest—4 per cent on estimated cost of $75,000.00	3,000.00	3,000.00
	$9,326.21	$8 886.21

Note: The cost of instructors, matrons, and janitors for the evening use of the pools is not included above. During 1926 these costs amounted to $14,650.26. During 1926 there was received for the evening use of swimming pools $12,063.00.

BUILDING NEWS

—The schools of Downers Grove, Ill., are keeping up with the needs of the community under the direction of Supt. Ernest Iler, who has been in charge during the past five years. During the last year a fine grade school was erected and sites were purchased for two further grade schools. A high school is under construction at the present time.

—On the site where a new community schoolhouse was dynamited with a loss of 45 lives in the spring of 1927 at Bath, Mich., a new consolidated school is to be erected. The structure is the gift of James Couzens, United States senator.

—The New York City Board of Education has issued a report showing that a total of eleven school buildings, with a seating capacity of 9,327 and a cost of $5,199,889 have been completed during the period from July 1 to October 31, 1927. A total of 27 school buildings are at present under construction providing seatings of 39,521 and involving a cost of $23,777,255.

School buildings completed or under construction during the period from January 1, 1918, to October 31, 1927, include 235 elementary buildings erected at a cost of $139,623,509 and 21 high-school buildings erected at a cost of $45,989,894. The 256 buildings listed have a seating capacity of 321,937 and involve a total cost of $185,613,404.

—Sacramento, Calif. The board of education has taken steps to issue a call for a bond issue for new and added school units throughout the city.

As a preliminary step to the bond issue, the board has begun a comprehensive survey of the school facilities needed. With the completion of the survey, the board will have a definite basis upon which to work and the citizens will be acquainted with the new buildings and additions needed.

The new buildings have been made necessary as a result of the rapid growth of Sacramento. When the present buildings were erected the city had a population of 65,000 and few were optimistic enough to believe that within ten years the population would be almost twice as great. The new buildings will afford relief in crowded districts and will also provide needed school facilities in the new residential districts which have been established in outlying sections.

—Redwood City, Calif. The corner stone of the McKinley Grammar School was laid in October. The school is located on a twelve-acre site and will be completed at a cost of $175,000.

—A new gymnasium costing $95,000 has been completed at Bakersfield, Calif.

—Construction work has been begun on the first unit of a group of grammar-school buildings on the Victory school site at Los Angeles, Calif. The building is two stories high and will cost when completed, $117,000.

—A bond issue of $75,000 was approved recently at Soledad, Calif. The architect is preparing plans for a new building of eight rooms.

—Wilmington, Del. A new high school for colored students is under construction at the present time. The building will have accommodations for approximately 1,000 pupils and will be completed at a cost of nearly $1,000,000.

Plans have been completed for a new elementary school to accommodate 1,400 pupils, and to cost $725,000 including the site. It is planned to erect three additional buildings, one for colored pupils and two for white children. The total cost of these buildings will reach $1,000,000.

—Cicero, Ill. The citizens have voted an appropriation of $200,000 for an 18-room addition to the Burnham School. The building will be of fireproof construction and will relieve the congestion in the school.

—San Luis Obispo, Calif. The new senior high school is now under construction. The building will be completed at a cost of $350,000.

—Pocatello, Idaho. A large addition to the Roosevelt School will be occupied with the opening of the second semester. The building accommodates 490 pupils and was erected at a cost of $50,000.

—The school board of Berkeley, Calif., has under construction at the present time, one three-room addition, one eight-room, and one sixteen-room addition to existing schools. A new administration building was occupied in September last.

—Monrovia, Calif. The school board has approved the plans for a new high school for which $625,000 in bonds were recently voted. It is planned to begin the construction work in a short time. A new elementary school, with accommodations for 500 students, was occupied in September. The building was erected at a cost of $125,000.

—Harrisonburg, Va. The school board has awarded the contract for the erection of the first unit of a high school, to cost $225,000. The building will occupy a site of 30 acres, and will cost complete, about $400,000.

—The school board of Indianapolis, Ind., has adopted a budget calling for an appropriation of $1,380,000 for four grade schools and additions to three existing buildings.

—Springfield, Mo. The school board has employed an architect to make a survey of the school plant preparatory to undertaking the modernizing of the school buildings. The survey is intended to show the needs of the schools and to offer estimates of the cost of the work.

—Two elementary schools have been erected at Jackson, Miss., at a cost of $100,000.

—The school board of Natchez, Miss., has begun the erection of a modern high school. This building completes the building program which was begun four years ago.

(Concluded on Page 118)

American Cities
GREENSBORO, N. C.
The Jefferson Standard Life Insurance Co. Building
Drawing by M. PAUL ROCHE
(Series No. 10)

IN THE SOUTH, too, as in other sections of the country, Duraflex-A Flooring is the choice of Architects and Owners who are building for beauty and permanency. The permanent, seamless wearing surface of a Duraflex-A Floor meets every requirement of modern construction and economy. At a very small cost, Duraflex-A can be maintained in perfect condition for the life of any building. Write for data and specifications.

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DURAFLEX-A FLOORING

A Recent Duraflex-A Installation
Auditorium, North Carolina College for Women, Greensboro, N. C.
Harry Barton, *Architect*
The Jefferson Standard Life Insurance Company Building
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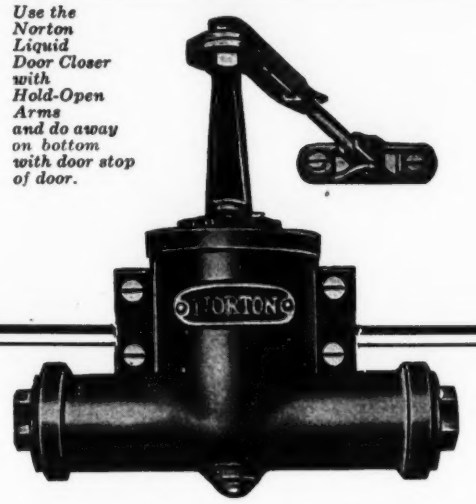
has 150,000 sq. ft. of Duraflex-A Flooring

The NORTON Closer With Hold Open Arms Is Best Suited For Schoolhouse Work

Every Schoolroom Should Have One



Use the Norton Liquid Door Closer with Hold-Open Arms and do away on bottom with door stop of door.

1st. The doors are closed with a uniform speed, which gives the pupils a chance to go through a door without getting caught or injured.

2nd. Having two speeds, the speed at the latch can be set for absolute quiet—no latch necessary.

3rd. The Hold-Open Device connected with the arm of the Door Closer is automatic, a child can operate it—just a push or pull on the door is all there is to do it. Does away with door stop, hook, or strap to hold the door open.

SERVICE:—We have expert servicemen on call, free of charge.

PRICE:—The price is right. Send for a representative.

THE NORTON DOOR CLOSER CO.

2900-2918 N. Western Avenue, Chicago, Illinois.

A Partial List of Schools NORTON Equipped

Skinner Junior High School, Denver, Colo.

North East High School, Minneapolis, Minn.

Chicago Public Schools

Toronto Public Schools

East Side High School, Cincinnati, Ohio.

Cass Technical High School, Detroit, Mich.

Technical High School, Omaha, Nebr.

(Concluded from Page 116)

—The Griffith School at Ferguson, Mo., was formally opened with a special program on November 6.

—Grand Junction, Colo. The school board has completed an extensive building program involving a cost of $300,000. The completion of the program has provided modern school facilities for every pupil enrolled and has brought the school plant up to a modern standard.

—Poughkeepsie, N. Y. The citizens recently approved four school propositions involving a total appropriation of $719,300. The proceeds of the bond issue will be used for the erection of two schools, an addition to a third, and the purchase of a new site.

—Bolton, N. Y. The school district has authorized a bond issue of $265,000 for a new high school to take the place of an old building erected many years ago.

—Scarsdale, N. Y. The voters of School Dist. No. 1 have approved an appropriation of $400,000 for a new school in the Fox Meadows section.

—Batavia, N. Y. A bond issue of $400,000 has been approved for the erection of three grade schools. The buildings are to be ready for occupancy in September, 1929.

—Tuckahoe, N. Y. The corner stone of a $450,000 high school was laid in October. The building is located on a large site, and consists of three structures joined. The auditorium which is in the left wing, will seat 1,000 persons.

—Kenmore, N. Y. The citizens have approved a bond issue of $725,000 for an addition to the high school and additions to the Washington school. This is the second appropriation for new buildings and brings this year's appropriations well over one million dollars.

—Plans have been prepared for a three-story high school to be erected at Tell City, Ind. The building which will be entirely fireproof, will cost $150,000. The building will be erected from plans prepared by Charles L. Troutman, Evansville, Ind., and H. Clifford, Kreisle, Tell City.

—Two new elementary schools were opened in Bridgeport, Conn.,—the Beardsley School, a ten-room addition with assembly hall and gymnasium, and the Nathan Hale School, the first unit of a twenty-room building. Both these schools were dedicated with appropriate exercises, Superintendent Carroll R. Reed and President Elmer H. Havens being the speakers.

—The new building program adopted by the board of education of Seattle, Wash., is well under way. It was authorized last March in a bond issue of $2,400,000. Two buildings are completed and the number of pupils housed in portables a year ago has been reduced from 4,856 to 3,588.

—The school district of New Troy, Mich., passed a $75,000 bond issue for a new school. The board was enjoined by protesting citizens holding that amount was too high and that $40,000 would be sufficient. The issue will now be fought to a finish.

—The new Cranbrook School for Boys, near Birmingham, Mich., is the gift of Mr. and Mrs. George G. Booth of Detroit, and has an endowment of more than $2,225,000. The school now under construction, is being erected on a 65-acre site from plans prepared by Eliel Saarinen, an architect of Helsingfors, Finland. Dr. W. O. Stevens, White Plains, N. Y., will be the directing head of the school.

—Worcester, Mass. In accordance with a plan adopted in 1923, the special committee on schoolhouse accommodations presented its report for the year 1926-27 in the form of a fifth annual building program. The committee expressed its satisfaction with the work accomplished during the past year.

During the past year two 8-room buildings, a 12-room building, and two 8-room additions were erected, making a total gain of 44 classrooms each accommodating 40 pupils. There are at the present time 632 pupils on part-time schedules, which will be reduced to 485 with the completion of the May Street School.

The committee suggested that all future sites for new schools be selected with regard to the particular zone as interpreted in the zoning law. It was suggested that a study of present schools and school districts be made with a view of changing the present zones.

—The school board of South San Francisco, Calif., during the past year completed two new schools—one a $120,000 elementary school with auditorium, and the other a high-school gymnasium costing $54,000. The buildings have been provided with the latest and best in equipment and apparatus, and the school grounds have been improved with lawns and shrubs. The schools have had a twelve-per-cent increase in attendance this year and the new buildings will prove of great help.

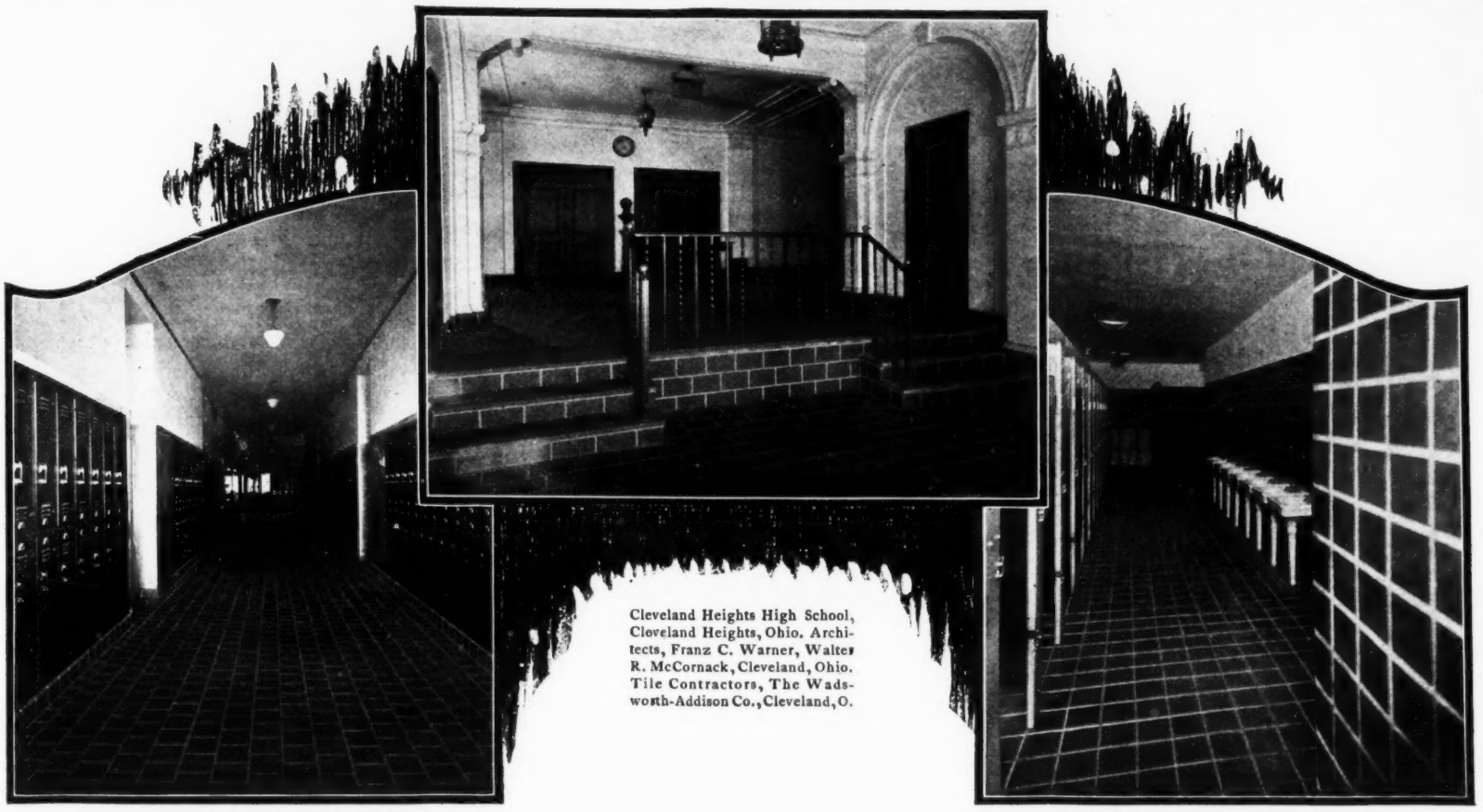
—Lynn, Mass. A new public-school administration building is in course of erection in the city. It is expected that the building will be one of the best of its kind in the country.

—One of the schools in Toronto, Ontario, has installed an ozone equipment under the direction of J. S. Paterson, heating and ventilation engineer for the board of education. Mr. Paterson states that his department has standardized on low-pressure boilers for the Toronto schools, with direct radiation in all rooms sufficient in amount to keep all classrooms open for business under any conditions likely to be met with in that part of the country. Fresh air supply passes through indirect heating coils, capable of raising the air from 10° below zero to 80° above and divided into tempering and reheating coils, with air washers between. Galvanized-iron ducts extend along basement ceilings and continue up to classrooms, entering on side walls directly opposite the windows. Instead of single openings, as in the old systems, double openings are used, giving better distribution. An air velocity of 300 ft. per minute at the opening is allowed and the openings are placed rather higher than before.

—Abington, Pa. The cost of educating the pupils in the public schools of Abington township the last year was $346,380. Of this amount, $246,995, or 7.3 per cent, was spent for teachers' salaries; $418,524 for buildings and grounds; $49,000 for equipment, and $123,781 for debt service. The cost per pupil in average daily attendance for current expenses was $135.

The tax rate for the community is 25 mills on the assessed valuation, plus a per capita tax of $3. The assessed valuation is estimated at forty per cent of the actual value of the property in the district.

—The state of Alabama proposes a $20,000,000 bond issue for the purpose of aiding the several units in building new schoolhouses. The bond commission, composed of the governor, the state superintendent of education, and the attorney general, are empowered to sell these bonds as they are needed. They are not to be sold all at once. They are to be retired as fast as funds on hand will permit.



Central High School, Flint, Mich. Architects, Malcomson, Higgenbotham & Palmer. Tile Contractor, Flint Tile & Fireplace Co., Flint, Mich.

Cleveland Heights High School, Cleveland Heights, Ohio. Architects, Franz C. Warner, Walter R. McCornack, Cleveland, Ohio. Tile Contractors, The Wadsworth-Addison Co., Cleveland, O.

Main Toilets, Jesuits College, New Orleans, La. Architects, Wogan & Bernard. Tile Contractors, Zimmermann's Building Specialties Company.

Children Respond to the Beautiful!

IN the days of the little red schoolhouse, there was nothing particularly beautiful or cheery to greet the youngsters as they reported for the day's schooling—unless it was the big stove on a cold morning. So, too, in the larger city schools of that same period, with their cheerless halls and recitation rooms, there was little to attract the children to that building.

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That is an important advantage — still more important in that Romany Quarry Tiles are absolutely "boy-proof." Let them scuff, let them pound, let them slide; these tiles still retain their original fresh appearance and beauty — unmarred and unscarred after years and years of this service.

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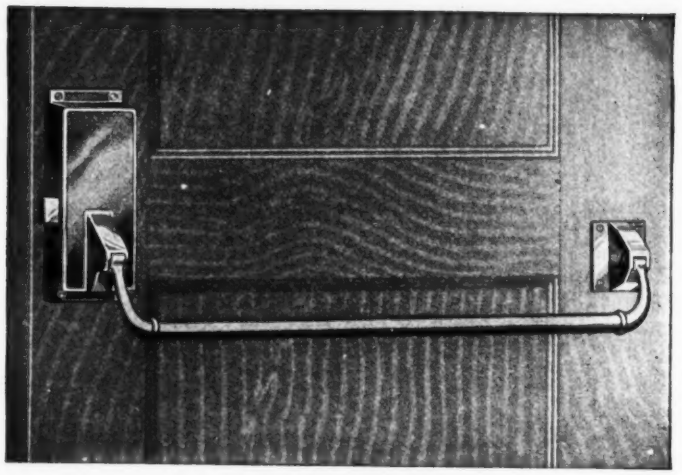

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WRITE FOR CATALOG

WASHINGTON CORRESPONDENCE

A. C. Monahan, Formerly U. S. Bureau of Education

U. S. Supreme Court's Decision of Race Segregation

The U. S. Supreme Court has issued an important decision on race segregation of children in public schools, sustaining the action already taken by the state of Mississippi.

The question came to the Supreme Court from Mississippi on an appeal in the case of a girl, the daughter of an American citizen of Chinese descent, who was excluded from a public school for white children. Chief Justice Taft delivered the opinion. He states:

"This was a petition for mandamus filed in the State Circuit Court of Mississippi for the First Judicial District of Bolivar county.

"Gong Lum is a resident of Mississippi, resides in the Rosedale Consolidated High School District, and is the father of Martha Lum. He is engaged in the mercantile business. She was 9 years old when the petition was filed, having been born January 21, 1915, and she sued by her next friend, Chew How, who is a native-born citizen of the United States and the state of Mississippi.

"The petition alleged that she was of good moral character between the ages of 5 and 21 years, and that as she was such a citizen and an educable child it became her father's duty under the law to send her to school; that she desired to attend the Rosedale Consolidated High School; that at the opening of the school she appeared as a pupil, but at the noon recess she was notified by the superintendent that she would not be allowed to return to the school; that an order had been issued by the board of trustees, who are made defendants, excluding her from attending the school solely on the ground that she was of Chinese descent and not a member of the white or Caucasian race, and that their order had been made in pursuance to instructions from the state superintendent of education of Mississippi, who is also made defendant.

"The petitioners further show that there is no school maintained in the district for the education of children of Chinese descent and none established in Bolivar county where she could attend. . . .

"The petition was demurred to by the defendants on the ground, among others, that the bill showed on its face that the plaintiff is a member of the Mongolian or yellow race, and, therefore, not entitled to attend the schools provided by law in the state of Mississippi for children of the white or Caucasian race.

"The trial court overruled the demurrer and ordered that a writ of mandamus issue to the defendants as prayed in the petition.

"The defendants then appealed to the Supreme Court of Mississippi, which heard the case, Rice v. Gong Lum, 139 Miss. 760. In its opinion, it directed its attention to the proper construction of section 207 of the State Constitution of 1890, which provides:

'Separate schools shall be maintained for children of the white and colored races.'

"The Court held that this provision of the constitution divided the educable children into those of the pure white or Caucasian race, on the one hand, and the brown, yellow and black races, on the other, and therefore that Martha Lum of the Mongolian or yellow race could not insist on being classed with the whites under this constitutional division.

The Mississippi Supreme Court said: "The legislature is not compelled to provide schools for each of the colored races, and, unless and until it does provide such schools and provide for segregation of the other races, such races are entitled to have the benefit of the colored public schools . . . If the plaintiff desires, she may attend the colored public schools of her district, or, if she does not so desire, she may go to a private school. The compulsory school law of this state does not require the attendance at a public school, and a parent under the decisions of the Supreme Court of the United States has a right to educate his child in a private school if he so desires. But the plaintiff is not entitled to attend a white public school.'

Chief Justice Taft goes on to state: "She is not denied, under the existing school system, the right to attend and enjoy the privileges of a common-school education in a colored school. If it were otherwise, the petition should have contained an allegation showing it.

Had the petition alleged specifically that there was no colored school in Martha Lum's neighborhood to which she could conveniently go, a different question would have been presented, and this, without regard to the State Supreme Court's construction of the state constitution as limiting the white schools provided for the education of children of the white or Caucasian race. But we do not find the petition to present such a situation.

"The case then reduces itself to the question whether a state can be said to afford to a child of Chinese ancestry born in this country, and a citizen of the United States, the equal protection of the laws by giving her the opportunity for a common-school education in a school which receives only colored children of the brown, yellow or black races.

"The right and power of the state to regulate the method of providing for the education of its youth at public expense is clear. In Cummnng v. Richmond County Board of Education, 175 U. S. 528-545, persons of color sued the board of education to enjoin it from maintaining a high school for white children, without providing a similar school for colored children which had existed and been discontinued.

Mr. Justice Harlan, in delivering the opinion of the court, said: "Under the circumstances disclosed, we can not say that this action of the state court was, within the meaning of the fourteenth amendment, a denial by the state to the plaintiffs and to those associated with them of the equal protection of the laws or of any privileges belonging to them as citizens of the United States. We may add that while all admit that the benefits and burdens of public taxation must be shared by citizens, without discrimination against any class on account of their race, the education of the people in schools maintained by state taxation is a matter belonging to the respective states, and any interference on the part of Federal authority with the management of such schools can not be justified except in the case of a clear and unmistakable disregard of rights secured by the supreme law of the land.'

"The question here is whether a Chinese citizen of the United States is denied equal protection of the laws when he is classed among the colored races and furnished facilities for education equal to that offered to all, whether white, brown, yellow, or black.

(Concluded on Page 122)

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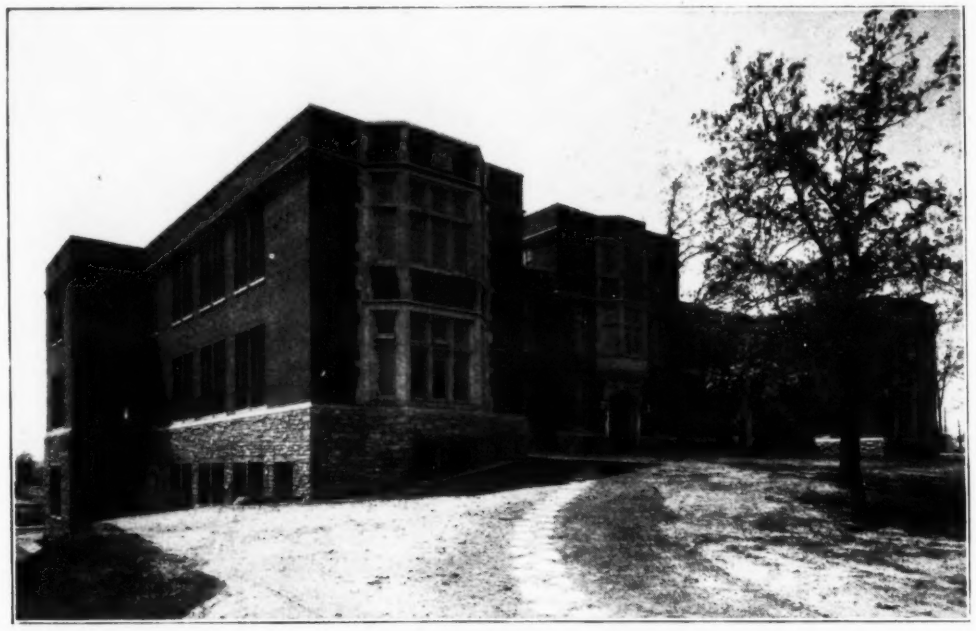

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Our Engineering department can give you valuable assistance in planning and arranging a new locker installation—or suggesting improvements in your present one as you need additional locker space.

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(Concluded from Page 120)

"Were this a new question, it would call for very full argument and consideration, but we think that it is the same question which has been many times decided to be within the constitutional power of the state legislature to settle without intervention of the Federal Courts under the Federal Constitution. . . .

"Most of the cases arose, it is true, over the establishment of separate schools as between white pupils and black pupils, but we cannot think that the question is any different or that any different result can be reached, assuming the cases to be rightly decided, where the issue is between white pupils and the pupils of the yellow races. The decision is within the discretion of the state in regulating its public school and does not conflict with the fourteenth amendment.

"The judgment of the Supreme Court of Mississippi is affirmed."

SCHOOL LAW

WISCONSIN SCHOOL DECISIONS

The Wisconsin State Department of Education issued the following legal opinions:

A board of education of a city has power to dismiss a teacher or a superintendent for cause only. The board must be perfectly satisfied that the reasons for dismissal are such as, when brought to the attention of a court, would convince the court that dismissal was justifiable. The burden of proof that the board was justified rests upon the board. It must be clearly recognized that a teacher or a superintendent who is dismissed is privileged to bring his case into court and sue on his contract, unless the court holds that the action of the committee is justifiable he will collect his salary the same as it would have been paid to him had he remained in his position and no effort had been made to dismiss him.

Complaints made by parents concerning the conduct and management of the school by the teacher should be made to the school board, and when so made it is the duty of the board to arrange for a regular board meeting at which the parties in interest are granted a hearing. It is entirely proper for a school-district board upon complaint of a parent or guardian to immediately take steps for the purpose of determining whether the complaint is justified.

—The state education department of Wisconsin has rendered an opinion to the effect that neither the school board nor the district is liable in damages for any accident occurring to children while playing on or about the school building, and with school-ground equipment.

The Wisconsin laws require that the schoolhouse and grounds be kept in good condition and that all necessary equipment for the comfort, convenience, and advancement of the school be provided. If the building is out of condition, it is the duty of the board to see that it is properly repaired, well lighted, and properly heated. The safety of the school building from fire must be assured. Schoolrooms and entrances must be kept in good, usable condition at all times. When a person accepts membership on a board, he agrees to render service for the general benefit and welfare of the community, even though the money compensation may be inadequate for the service rendered.

LAW AND LEGISLATION

The supreme court of California recently rendered an important decision affecting the independence of boards of education. The suit was based upon the fact that the budget of the San Francisco board of education was cut down approximately $1,000,000 by the local board of supervisors. The issue was carried to the supreme court with the result that the board of education won out. In commenting upon the case, A. J. Cloud, chief deputy superintendent of the San Francisco schools, said: "The decision is also interesting in that it will strengthen the movement toward fiscal independence of boards of education. Such a course is wholly in line with the curve of progress in school administration in the leading cities of the United States during the past quarter century. The responsibility becomes fixed. Boards of education, as trustees of the people's interests in the education of the community's children, can be held definitely accountable both for their acts and their failures to act. Authority and responsibility are united."

The new textbook law of Texas provides that affidavits must be filed with textbook bids by publishers disclosing the names of those who aided them in securing state business.

The school board of Battle Creek, Mich., is engaged in determining its rights as against the authority given county supervisors over the financial affairs of the school district. President E. L. Branson states that counsel had been retained for the school board in opposition to the recent act of the county board of supervisors in cutting the school budget from $900,000 to $700,000, planned to disclose all the laws pertaining to the question before a decision is made on the possibility of the school board testing by suit, the supervisors' restrictive measure. The powers of the school board are clearly defined in its charter but those of the county board are set forth in sections of the general laws.

Governor Martineau of Arkansas, in an address before the state education association, favored the county-unit plan in school government. The plan now is optional with the counties. Pulaski county is already operating under the plan.

—Boston, Mass. A proposal to repeal the law which permits school children to travel for half-fare on local street railways, which is under consideration by the state department of public utilities, has brought a storm of opposition from school committees, municipalities, and representatives of the public. The street railway officials do not favor the repeal of the law but advise that it be modified to eliminate abuses which have crept in since the law was passed.

—The right of a board of education in Oklahoma to use public funds for the teaching of adults is being passed upon by a special committee of attorneys in conference in the attorney general's office. In an opinion handed down by the attorney general, it was held that a board of education doesn't have the right to use public funds for schools for adults, nor for the serving of food in the school cafeterias.

Under the rules of the system, a student who falls below 80 merits will not be eligible to act as captain of an athletic team or officer of an organization. A student who falls below 70 will be ineligible to represent the school in any capacity and will be ineligible for promotion. Loss of merits may be sustained through unexcused tardiness, misconduct, destruction of property, cutting classes, cheating, or coming to class without materials.

New PeerVent Unit with front plate removed, showing improved fan housings (1), new position of air filter (2) under the fans, and the highly efficient new radiator (3).

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All heating and ventilating units are similar in their operating principles. The differences are in details — motors, fans, radiators, dampers, and controls. The new PeerVent Unit, announced in these pages last month, has valuable improvements in *all* of these details.

The earlier Peerless and PeerVent Units were perfectly satisfactory to users. They have been sold in large numbers for nearly fifteen years. But the new unit is even better, and we urge everyone interested in heating and ventilating apparatus to send for the new PeerVent Catalogue.

NEW A.C. MOTOR. The new PeerVent Unit can be equipped with a special A.C. motor, as quiet in operation as a D.C. motor, for either single or polyphase current. This improvement is the final step in placing the unit system on a strictly unit basis. It makes it possible to operate a single unit after hours as economically per unit of service as though the whole system were operating. The motor-generator outfit is eliminated, which means lower first cost and less operating expense.

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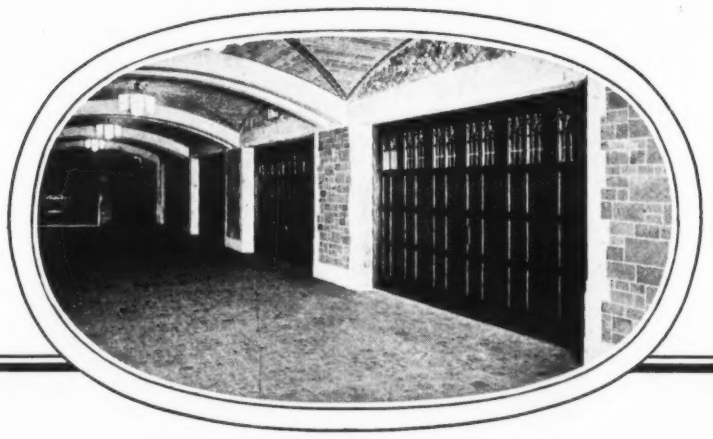

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SCHOOL FINANCE AND TAXATION

WISCONSIN'S NEW SCHOOL-SUPPORT LAW

The new equalization law enacted by the Wisconsin legislature which went into effect January 1, 1928, enables the distribution to the schools of approximately six million dollars.

There are two bases for apportioning this money—the flat-rate basis and the equalization basis.

1. The Flat-Rate Basis. The state apportions to every district in the state $250 per elementary teacher. The county also apportions to every district $250 per elementary teacher. Districts which have closed their schools and transport the children are counted as having a teacher. (The number of teachers is determined as of March 1, 1927.)

For districts with a full valuation of $250,000 or more per elementary teacher, $500 ($250 state, $250 county) is all the aid the district receives. Whatever additional amount it requires to maintain the school the district levies. For instance, if it requires $1,400 to maintain a school, the state and county will apportion $500 to the district, leaving a balance of $900 for the district to raise.

The amount of money to be apportioned by the state on this basis will approximate $3,800,000.

2. The Equalization Basis. For districts with a full valuation of less than $250,000, the state and district pay jointly. The district pays on its full valuation to the nearest thousand dollars and the state pays on the difference between the district's full valuation and $250,000. The district's school-tax rate is used in each case but the state will not pay more than 4 mills. The less the district's valuation, the greater the state aid. In no case will the state apportion more than $600 per elementary teacher on this basis. Approximately $1,600,000 will be apportioned by the equalization feature.

The amount of state aid to districts with a real valuation less than $250,000 cannot be determined until the school board at the annual meeting in July, 1928, determines the amount necessary for maintaining the school and making the tax levy.

A STUDY OF COST TRENDS IN EDUCATION IN THE STATE OF PENNSYLVANIA

Some Interesting Facts Brought Out in a Study by Mr. J. C. Werner of Coraopolis, Pa.

During recent years there has been much comment concerning the rapidly increasing cost of education in the state and in the country at large. It has been noted that expenditures for new buildings have been large, and that instructional and operating costs have steadily increased. Many pertinent questions relative to cost figures have been raised. For example, it was the purpose to learn which costs had increased rapidly, current expenditures or total expenditures? Also, what has been the increase in state appropriations? Has the proportion of expense borne by the state increased or decreased? In a word, it was the aim to discover the real facts relative to increased school costs.

In an endeavor to answer these financial questions, Mr. J. C. Werner, supervising principal of schools at Coraopolis, Pa., made a study of the financial reports of 16 school districts in Allegheny county, with a population of between 5,000 and 10,000. The study covered the school years 1921-22 and 1926-27 inclusive, and embraced the school districts of Avalon, Bellevue, Coraopolis, Crafton, Dormont, East Pittsburgh, Etna, Glassport, Millvale, Munhall, Pitcairn, Rankin, Sharpsburg, Tarentum, Turtle Creek, and Wilmerding.

Cost Items Embraced in the Study

Three items of cost, namely, current expenditures, total expenditures, and state appropriations were embraced in the study. In each case, the totals for each item for the 16 districts were considered. The total of expenditures and appropriations are shown in Table No. 1.

TABLE No. 1—Total Expenditures Embraced in Six-Year Period

Year	Current Expenditures	Total Expenditures	State Appropriations
1921-1922	$1,424,246	$2,425,466	$155,484
1922-1923	1,586,452	2,698,670	185,906
1923-1924	1,653,963	2,449,677	317,394
1924-1925	2,076,454	3,196,803	212,190
1925-1926	1,938,702	3,062,209	231,323
1926-1927	2,033,269	3,265,920	238,103

Variability in Expenditures and State Appropriations

When the amounts indicated in the table are reduced to percentage comparisons, the variability is shown much more clearly. Table No. 2 shows this variability from year to year in each of the three totals under consideration.

TABLE No. 2—Annual Variability in Current and Total Expenditures and State Appropriations

Variability from	Current Expenditures Per Cent	Total Expenditures Per Cent	State Appropriations Per Cent
1922 to 1923	+11.2	+11.2	+19.5
1923 to 1924	+ 4.2	— 4.2	+70.7
1924 to 1925	+25.5	+30.9	—33.1
1925 to 1926	— 6.6	— 4.2	+ 0.9
1926 to 1927	+ 3.9	+ 6.6	+ 2.9
1922 to 1927	+42.7	+34.6	+53.1

Several comments may be made upon the information contained in this table. In the 1923-24 term the state appropriations increased 70.7 per cent over the appropriations of the 1922-23 term. This increase was due largely to the fact that in 1923-24 all overdue appropriations, together with those of the current year, were paid. This was the culmination of Governor Pinchot's efforts to put the state upon a pay-as-you-go basis. Another interesting item is the large increase in both current and total expenditures which occurred during the next year. Whether the receipt of the increased state appropriations tended to increase the various districts' expenditures unduly is a matter of conjecture. Another item of significance is the relative increases over the six-year period. Here we have definite evidence that, for the districts under consideration at least, the increase in state aid during this period has been relatively greater than the increase in current and total expenditures. The table also shows that the current expenditures for these districts have increased more rapidly than have the total expenditures.

Distribution of Expenditures for Six-Year Period

One more question raised at the beginning remains to be answered, namely, "Has the proportion borne by the state increased or decreased?" The following table shows the distribution for both current and total expenditures over the six-year period.

TABLE No. 3—Proportion of Educational Expenditures Borne by the State

Year	Current Expenditures Per Cent	Total Expenditures Per Cent
1921-1922	10.9	6.4
1922-1923	11.8	6.9
1923-1924	19.1	12.9
1924-1925	10.2	6.6
1925-1926	11.4	7.5
1926-1927	11.2	7.2

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SUCH is the endorsement given Oakite by the head dietitian of high schools in one large city. She finds Oakite "the best material she ever used" because her kitchen and cafeteria cleaning are done thoroughly and efficiently.

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This table clearly indicates that the state has increased its share of the educational burden during the six-year period. With the exception of the year 1923-24, the percentage of total expenditures has remained relatively constant each year, with a very slight upward tendency. This upward tendency is gratifying but there still is need of additional increases insofar as the districts under consideration are concerned, before the portion borne by the state approximates national averages.

FINANCE AND TAXATION

A special levy is contemplated by the board of education of Akron, Ohio, in order to meet a $400,000 deficit threatened during the coming year. "Greater cuts in teachers' salaries and in school activities will have to be made if the tax levy is not approved," said Pres. J. B. Hanan of the board. "It will mean a shorter school term for next year, or lower salaries for teachers, a curtailment of all special activities in the schools and continuation of the crowded conditions and scarcity of teachers."

—Pocatello, Idaho. The school district has called in $100,000 of its outstanding bonds, which are bearing interest at the rate of five per cent. Refunding bonds will be issued to replace them, these to be sold to the state at a rate of 4.6 per cent. It is estimated that the change will produce an annual saving of $400 in interest.

—Akron, Ohio. The voters, at the regular November election, approved a five-mill levy to cover a period of five years. The new levy displaces one for three mills voted in 1923, and adds two additional mills. The board of education has asked that four mills be assessed against the duplicate for the year 1928.

—The United States Supreme Court recently rendered a decision to the effect that lands given to colleges are not tax exempt if rented for revenue. Certain lands were given to Millsaps College, Jackson, Miss., but were not a part of the campus or college grounds. The law provides that one hundred acres shall be exempted, but it does not contemplate the ownership of lands used for other than educational purposes.

—The board of education of Lima, Ohio, recently appeared before the Ohio state tax commission in protest of the commission's decision to allow the school board only $4.20 on every thousand of taxable property instead of $4.85 as provided by statute. The board of education claimed it is entitled to $4.85 under the law, and representatives of the budget commission claimed that this amount was not necessary, inasmuch as the school board will profit largely from delinquent tax monies to be collected. The board of education replied it cannot feel assured that the delinquent tax monies will be brought in in sufficient amount to meet the school needs.

—The so-called old school board of Superior, Wis., has brought court proceedings against the new school board, contending that the state law regarding elective school boards is not applicable to Superior. It is expected that whatever the decision in the lower court may be the case will be carried to the supreme court.

TEACHERS AND ADMINISTRATION

SCHOLARSHIP OF TEACHERS IN NORTH CAROLINA

—The North Carolina Department of Public Instruction has issued a report on the scholarships of white teachers in the state. The report gives a detailed statement of the training of white teachers, covering the progress of the training, the relative standing of the several administrative school units and the percentage of teachers holding standard certificates in each unit of the state.

The report shows that the average scholastic training of all white teachers of the state for the year 1926-27 as evidenced by the scholastic index of 605.4 is slightly more than two years in college. In 1922-23 the index of the state as a whole was 513.3. Thus, it is seen that within four years the average training of all white teachers has been increased practically one year.

Considering rural systems and city systems separately, it is noted that the index of scholarship for white teachers in rural schools has increased 100 points, or raised one year from the standing of 1922-23. The index for white teachers in city systems has increased during the same period from 671.8 to 724.3, or slightly more than half a year's training. Although the rural gain has been double the city gain, it is noted that the average city index is more than two years above the rural index at the beginning of the period. City teachers had an average of nearly three years of college training in 1922-23, and now they have an average of more than three years' college training. Rural teachers, on the other hand, had slightly more than a half year in college in 1922-23, and this had increased to over a year and a half in 1926-27.

The report shows that the best trained white teachers are found in the eight largest city systems, city group I. The average teacher in this group has had training equivalent to 3.383 years in college.

City group II had the next highest index for 1926-27, 730.8, which represents 3.308 years of collegiate training. This group made the greatest gain in training of white teachers during the four-year period.

City group III had an index of 682.4 in 1922-23 and 726.7 in 1926-27, a gain of .443 of a year. Incidentally, this group had the largest percentage, 96.6, of its white teachers having two or more years of collegiate training.

On the whole, it is noted that teachers are better trained in city systems than in rural systems. Each of the systems in group I has teachers whose average training is better than three years in college. Asheville goes from eighth to third place, from an index of 690.1 to 741.0; and Greensboro goes from first place in 1924-25 to next to the last place.

In group II, Gastonia remains at the head of the list with Salisbury in second place.

Burlington remains in first place among the cities of group III and Mt. Airy holds second place. Greenville going from ninth place, takes third place from Smithfield.

In the state as a whole, it is shown that 96.6 per cent of the teachers held standard certificates in 1926-27, with 95.5 per cent of the rural and 99.8 per cent of the city teachers holding standard cer-

(Continued on Page 128)

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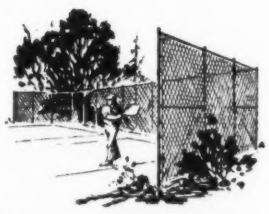

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(Continued from Page 126)

tificates. A total of 23 counties made this record in 1926-27, whereas in 1924-25 only five, and in 1925, only nine counties made such a record. It indicates the progress made in the improvement of training facilities for rural teachers of the state.

BETTER TEACHING IN THE HIGH SCHOOLS OF NEW YORK CITY

The Characteristics, the Part Played by Teachers, Chairmen, Principals, and Superintendents in Its Production

The present huge high-school system exists first, last, and always for the highest training of the youth of the city. The administrative officials may differ as to the aims and ideals, and as to the best ways of realizing them, but the main hope and desire of all is to provide those ways of growth and development of the students. In order to ascertain more clearly and definitely what the present teaching is, and how it may become the best teaching possible, Associate Supt. H. G. Campbell assigned to Dr. J. L. Tildsley, district superintendent in charge of high schools, the task of making a survey of the characteristics of the present instruction and suggestions for the solution of the problem of securing improved secondary-school teaching. Dr. Tildsley's keen and sincere interest in secondary education is well known and he undertook the work with untiring zeal.

Since it was impossible for one person with the time and assistance at his disposal to obtain and make use of the material that could be obtained from 135,000 pupils, 4,900 teachers, 450 heads of departments, and 37 principals of high schools, a unique plan was adopted for carrying out the impressionistic objective which had been kept in the foreground.

Under the arrangement, each chairman of an English department was asked through the principal to have at least 50 of the most able members of the graduating class answer definite questions as outlined in the procedure. They were asked to indicate which teacher or teachers they believed they would remember longest because of their influence in the classroom, and what was the reason for including these teachers in the list.

As it was desired to obtain the conception of best teaching prevailing in the minds of those best fitted to deal with the subject technically, it was asked that each principal send the names of the heads of departments who had done most during the last three years for the improvement of teaching; it was asked that they give the outstanding ways in which the principal has strengthened the teaching in the schools during the past three years; it was the desire to ascertain what a superintendent of the high-school division can do to improve teaching.

Next in importance to the contribution of the teacher himself to the teaching process is the contribution of the chairman; therefore each principal was asked to obtain the replies of teachers to the question as to the practices which have made for better teaching in the department in the last three years. Each teacher in training was asked to tell how the chairman of the department had helped him or her to become a better teacher. The principals were asked to state what a superintendent of the high-school division can do to improve the teaching.

As a result of the plan, pupils and first assistants gave pictures of super maximum teachers and analyzed the elements which have made teaching effective. The teachers told how the chairman take potential super maximum teachers and make them actualities.

In the matter of teacher recruiting, one chairman recommended that the superintendent conduct propaganda in high schools and colleges to induce proper young men and women to enter the ranks. One principal suggested that the superintendent should get in touch with some of the colleges outside of New York City so as to secure an adequate supply of trained men and women. Another principal suggested that the superintendent insist upon the highest possible standards for those entering the school system. Another suggested that the board of examiners should arrange their examinations and methods in order to attract to the city the best blood from schools outside of the city.

If superintendents could impress the board of examiners that scholarship without personality does not make a teacher, there might be eliminated from the eligible lists some very undesirable material. At present there is not enough consideration given to social background, character, and personality in the teaching force.

It seems that the most vital problem confronting the schools at the present time is the problem of securing competent teachers. The faculties are made up too largely of young and inexperienced teachers who know their subjects, but who know very little about what to teach or how to teach it.

The problem of the superintendent as a teacher recruiter brought to light a plan which might prove useful in warranting a change in the present rules. Under this plan, one of the district superintendents could be assigned to visit schools outside of New York, with the purpose of finding promising teachers and inducing them to take the New York examinations. The splendid reputation, fifteen years ago, of the schools of Montclair, N. J., was due to the efforts of Supt. Randall Spaulding, who visited schools in New England and found unusual teachers whom he induced to come to Montclair. The district superintendent might also visit in their classrooms, teachers in the elementary schools who have passed the written examination for high-school license and his report should be weighed with the teaching test as part of the oral examination.

One chairman reported that the superintendent should work for higher salaries for the classroom teacher, in order to attract a higher and better type of individual, especially men, into the work. It was emphasized that the teacher can never give his best efforts to the schools when he is worried about salary. One of the most valuable aids to supermaximum teaching is the release of anxiety for the teachers on the question of salary.

The teacher-in-training position offers an excellent chance to give college graduates practical experience in teaching under guidance. It was recommended that information concerning the teacher-in-training system be sent to colleges throughout the country and that such colleges be placed on an equal footing with the local colleges in respect to the issue of license to candidates for this license. It was also recommended that there be an increased appropriation for the expansion of the teacher-in-training system so that the schools might have more than 300 teachers in training the coming year. During the past year there were 125 teachers, and for the present year 150 were provided for in the budget. It was recommended that the teacher-in-training system be administered as a teacher-training process, as a nursery for superior teachers, and that a district superintendent be given charge of the work with power to make the assignment of teachers and to draw up the conditions of training. It was fur-

(Continued on Page 130)

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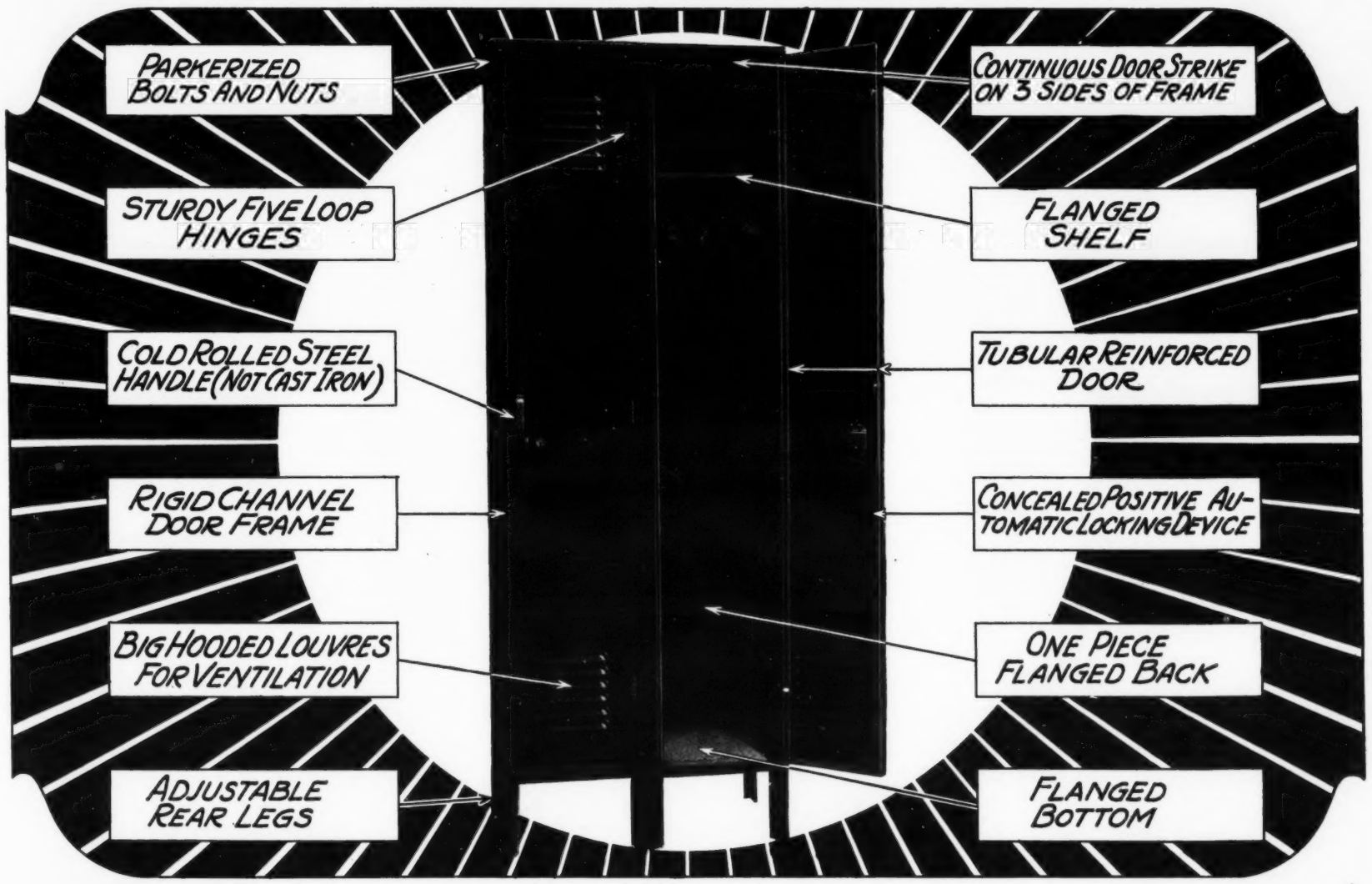
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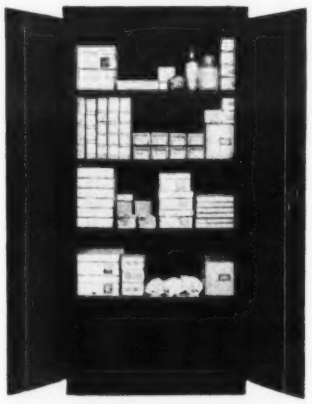

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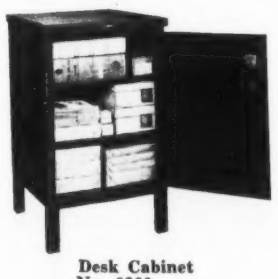

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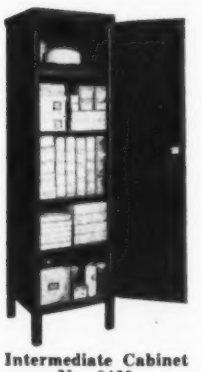

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(Continued from Page 128)

ther recommended that the board of examiners be asked to discontinue the examination for this license, and that the license be issued on the basis of a recommendation of the head of the department of the college.

In the matter of what the superintendent can contribute to better teaching, it was brought out that the superintendent has at his disposal one means of improving teaching, namely, he must prove himself to be a source of inspiration to better teaching. Without the ability to inspire others, the superintendent's efforts will count for naught. Among the excellent ideas for improving teaching there were many of a valuable character. It was urged that superintendents strive always toward the possession of recognized scholarship in some field of study, together with the superior knowledge of specific methods of instruction. He should become familiar with the subject matter of all courses and with the general methods of instruction. He should seek constantly a reappraisal of the aims of secondary education. He should visit the finest schools in the country to bring back new ideas, should conduct educational meetings outside of school sessions, should organize committees of qualified teachers in various subjects for the purpose of securing the best educational thought and the most successful methods of presentation.

Finally, it was brought out that the superintendent in charge of the high-school work can bring about better conditions if he will encourage the classroom teacher to believe that he or she can honestly accomplish the task assigned. To this end the superintendent may well urge the authorities to improve the teaching conditions in order that the resulting increased morale may bring about a higher quality of teaching. Again, it was shown that the superintendent can do a great service if he can devise an effective plan for keeping out of the academic high schools pupils who, because of lack of interest or inability, are unable to do high-school work. These pupils place a heavy burden upon teacher and organization and very materially decrease efficiency. They gradually reduce the heritage that the school owes to the willing and capable pupil. One of the great services which a superintendent can perform in high schools is to exert his influence in bringing out the enforcement of the compulsory-education law, and at the same time, to keep out of the schools those pupils who cannot get much good from high school and who make effective teaching difficult.

TEACHERS AND ADMINISTRATION

—The provision of a rural retreat for retired teachers of New York City, has received a set back. It develops that retired teachers prefer the city to the country. The beautiful eleven-acre estate, purchased for $37,000 last June by the Retired Teachers' Association in Cornwall, N. Y., is a veritable white elephant. The retired teachers prefer city surroundings and the only occupants of the estate at present are the caretaker and his family. The matter was thrown open to discussion as to whether or not the association should continue to maintain the home and make a drive to obtain patronage for the place or endeavor to sell it and buy another place nearer the city.

—Miss Annie Demarest, a teacher in the schools of Nyack, N. Y., was honored at a reception tendered by the board of education, on her fiftieth anniversary as a teacher, on the evening of October 7. Supt. H. J. Wightman spoke of the fine record made during the 50 years covered by the service. Mrs. Grace A. M. Sayres read a letter of congratulations sent by Commissioner of Education Frank P. Graves. As a closing ceremony, a book of names was presented to the guest of honor.

—The Adams Normal School has entered into an agreement with the public schools of Alamosa, Colo., under which the normal school uses the city schools as their laboratory for students in training, and in turn furnished certain supervisors. Under the plan in operation, Supt. G. P. Young is director of teacher training; Miss Adda M. Starrett is supervisor of instruction in junior and senior high schools; and Miss Isabel S. Young is supervisor of instruction in elementary schools.

—The attitude of the pupils toward the teachers was recently given attention in New York City. One of the criticisms elicited was that the boys and girls in the high schools do not like teachers who attempt to save a stupid, lifeless recitation by the use of "wise cracks.". Dist. Supt. John L. Tildsley summarized 1,900 replies received from students. Friend and comrade was cited in 245 cases, encouragement and sympathy in 122 and humor, tells jokes and anecdotes in 148. There were 384 students who, in recalling the teacher, thought of his methods, while 102 noted that he was systematic and 82 that he was thorough. There were 262 who specifically mentioned personality, the more discriminating speaking of the teacher's vividness (12), her charm (10), her culture (26), her enthusiasm (11), her beautiful voice and fine speech (38). There were 58 students who cited the teacher's attitude in the classroom toward freedom of thinking and freedom of speaking. The allowing of free discussion was cited by 102, while 92 noted broadmindedness, freedom of thought for their pupils, and tolerance.

—The district superintendents and high-school principals of New York City, in a recent statement, have urged the support of the salary increases for the teaching and supervising staffs recommended by the board of education. The school officials hold that adequate salaries at the top will produce a superior type of service from the lowest to the highest grades. The schoolmen show that the rates at present in force are inadequate for the higher positions and they point out that the new salary increases are not abnormally high or unjustifiable It is pointed out that superintendents and high-school principals are the successful men of the school system and that they advance to these positions after many years of experience, ranging from fifteen to fifty. On the other hand, young men of ability cannot be induced to become teachers in the schools and attain to the high positions, if they are unable to support a family in reasonable comfort and educate their children.

—The Georgia legislature has amended the charter of the Waycross schools, permitting the board of education to pension teachers of the schools after 25 years of service. The charter also provides a term of four years for members of the board of education, three members to retire at one time and four at another. Elections to fill vacancies are held every second year.

—A new rule of the board provides that teachers of the city schools of Waycross, Georgia, shall be paid on a twelve-month basis, instead of nine months.

—The state board of education of Virginia has adopted a resolution requiring a baccalaureate degree from an accredited college, after September, 1929, for all persons who aspire to high-school teaching in the schools of the state.

—The annual meeting of the Western New York Teachers' Association was held November 4 and 5, at Buffalo, with an attendance of approximately 9,000 teachers from Cattaraugus, Chautauqua, Erie, Genesee, and Niagara counties.

The convention held one general session, together with a number of sectional meetings in which demonstration lessons were given. Among the speakers were Commissioner John J. Tigert of Washington, Miss Zona Gale, Mr. Horace H. Lamberton, and Dr. H. W. Rockwell of the State Teachers' College of Buffalo.

—Somerville, Mass. The school board failed to adopt a resolution providing that married women be not appointed as regular teachers. The board has been asked to approve a recommendation providing that before the opening of schools in September each year, the committee shall nominate for election by the board, not more than twelve persons who shall be designated as cadet teachers, to serve for two years following appointment. Such cadet teachers must have a college degree or its equivalent, which has been earned by four years of study.

—Chicago, Ill. The board of education has proposed a revision of the rules governing leave of absence of teachers. The revised rule reads as follows: "The superintendent shall have authority, with the approval of the board, to grant a leave of absence for a period not exceeding one year, for any or all of the following purposes."

—The school board of Seattle, Wash., in a resolution has decided to ignore the local teachers' union on the salary-increase question. The union was not mentioned in the resolution, but it sets out that it will not deal with any class of teachers,

(Concluded on Page 132)

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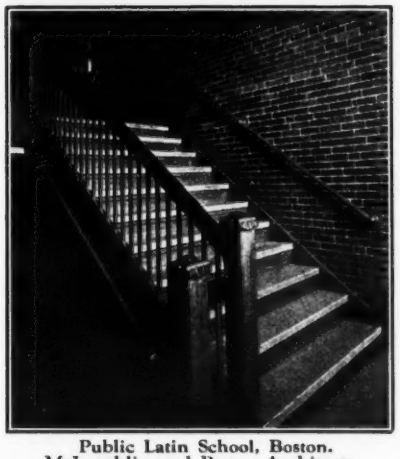

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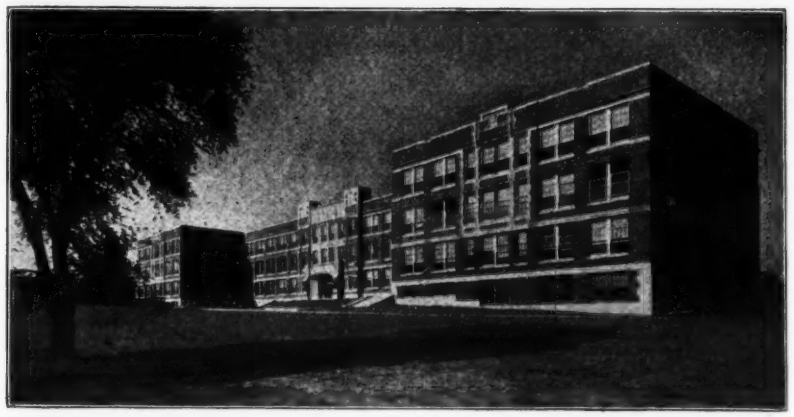
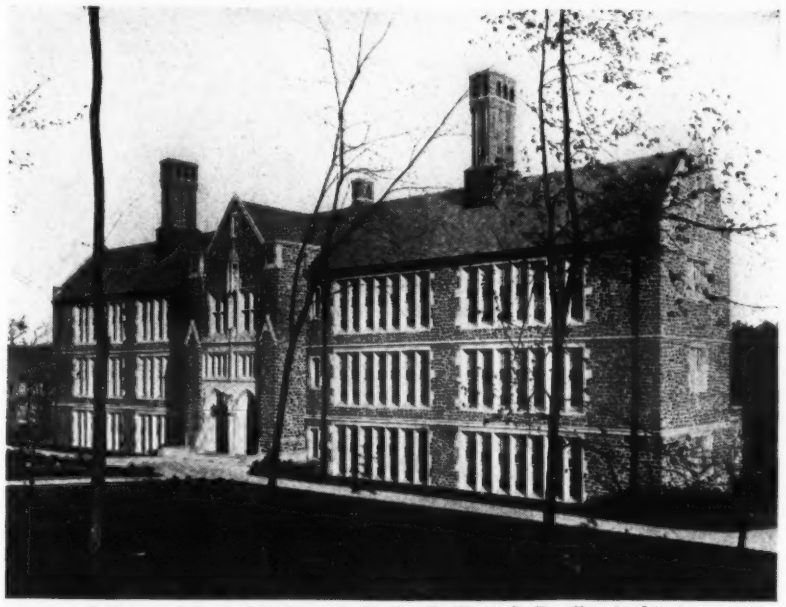


The Million Dollar High School, Dorchester, Mass. McLaughlin and Burr, Architects.



Jefferson School, Maplewood, N. J. Guilbert & Betelle, Architects.

Roosevelt High School, Yonkers, N. Y.
G. Howard Chamberlin, Architect

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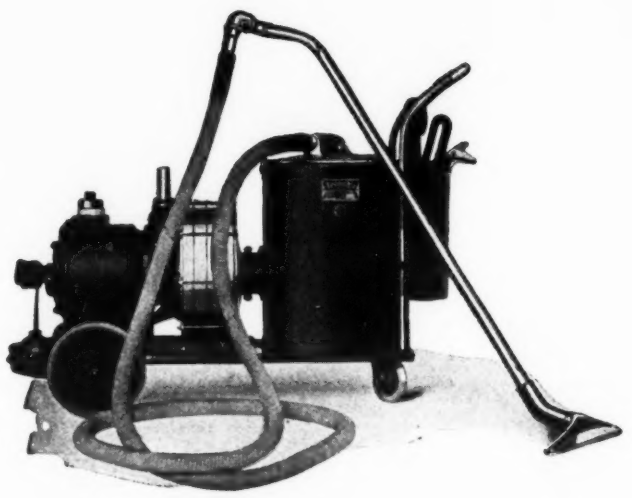

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(Concluded from Page 130)

but with the teachers as a whole and in their relation to one another.

"In this day of notoriety-seeking and the big rewards for sensational days, it is a wonder to us that there are any women left who are willing to go in for the poorly paid job of teaching school." says T. B. Shoaff, in the Shelby County (Ill.) *Leader*. "Yet we find among the mad throng that goes milling through life, a number of old teachers, men and women, who have passed their whole lives at the same occupation--making the rudiments of human knowledge and a few old-fashioned principles of conduct penetrate heads sometimes harder than the rocks. They have done it with their whole souls, throughout the length of a hard life in which the attention of others had little place. When they lie in their unknown graves, no one remembers them but a few humble people like themselves. But their recompense is in their love. No one is greater than those unknown."

—Cicero, Ill. A teachers' welfare society has been organized with a membership of more than 200 teachers. The society is operated under a state charter and provides sick benefits, hospital care, medical and surgical service free to its members.

At Cicero, Ill., the teaching staff working through the supervisors and the committee on courses, has completed a new course of study which has proved very efficient in use.

—A "preventorium" for Virginia teachers in need of preventive medical treatment has been provided by the Virginia Education Association. It will be located at Charlottesville, in the hospital unit of the University, now under construction, and will contain 20 rooms. Under a special arrangement, the association has made a contribution of $40,000 toward the cost of the building. The charge to teachers will be $4 per day, with a minimum charge of $15 to any patient. This covers the cost of professional service, room, nursing, and board.

—Miss Gladys E. Keyes, of San Diego, Calif., is in charge of the work of preparing the program for the annual convention of "visiting teachers" which will be held next summer, at Minneapolis, Minn., in connection with the National Education Association meeting.

—Manistique, Mich. The board of education has adopted a new salary schedule, which fixes a maximum salary of $1,475 per year for women teachers in the grades, and $1,750 per year for women teachers in the high school. The maximum for men teachers in the high school is $2,200.

—A writ of mandate, ordering the San Francisco, Calif., board of education to pay $190,000 back salary due San Francisco teachers, has been issued by Superior Judge W. P. Johnson. The money involved is six weeks' pay for various teachers withheld by the board in 1926, when the school year was changed to commence prior to June 30, 1926, instead of August 15. In making the change in the fiscal year, the board had ruled that salary not earned in the current fiscal year by teachers should not be paid. This deprived teachers of the six weeks' salary due for their summer vacation. The new decision forced the board to pay the back salary without delay.

THE CLEVELAND SALARY SCHEDULE FOR PRINCIPALS

—The school board of Cleveland, Ohio, has adopted a revised schedule for elementary principals in order to meet some new conditions which have risen in the last three years due to a decrease in enrollment in some of the schools. The old schedule for principals was based on the number of teachers in the buildings, a fact which would have forced a reduction in the salaries of about thirty principals had the old schedule been inforced.

In order to meet the situation, the board eliminated the lower ranges of the old schedule, retaining only the four upper ranges, and also changed the basis of classification from number of teachers or enrollment to capacity of buildings.

The new schedule provides for the following salaries based on the building capacity:

Group	Building Capacity	Minimum	2 Years	3 Years	Degree	Annual Increase
A	1,500 and over	$2,970	$3,570	$3,870	$4,170	$150
B	1,100 to 1,499	2,820	3,420	3,720	4,020	150
C	700 to 1,099	2,670	3,210	3,480	3,750	135
D	Below 700	2,535	3,075	3,345	3,616	135

Under the schedule, not more than two supervisory assistants may be employed in each building of the Group A type, one for each building in the Group B type, and from two-fifths to three-fifths time for each building in Group C. A building with a capacity of 3,000 or over may be granted three supervisory assistants, and the salary of the principal will be advanced one step in the schedule for Group A. Such assistants will be given a flat differential of $200, instead of a part at $200 and the remainder at $100 as formerly.

PERSONAL NEWS OF SUPERINTENDENTS

Teachers College, Columbia University, was given the honorary degree of doctor of letters at the University of the State of New York on October 20. On this occasion, the speakers were Dr. William F. Russell, present dean of the College, and Dr. Herbert S. Weet, superintendent of schools at Buffalo.

—Miss Ramona White, formerly a teacher at Alamosa, Colo., has become principal of the Willis School.

—Mr. F. B. Van Ornum of Wardham, Mass., has been elected superintendent of schools at Marion.

—Mr. J. E. Morris, former superintendent of schools at Alliance, Ohio, died at his home in East Cleveland, at the age of 70. Mr. Morris is survived by a wife and two daughters.

—Mr. F. E. Clerk, superintendent of the New Trier High School at Kenilworth, Ill., has accepted a new five-year contract beginning with July, 1928.

—Miss Mary Stewart, a former principal of Longmont, Colo., and a graduate of the University of Colorado, recently received the degree of master of letters from the University. Miss Stewart is at present director of the vocational department of the Boston American.

—Supt. L. A. Butler of Grand Rapids, Mich., has been given the degree of doctor of laws by Alma College.

—Mr. Roland Chatterton has been elected superintendent of schools at Portsmouth, Mass.

—Mr. Calvin Moon, a former superintendent of schools at South Bend, Ind., died November 10, at the age of 78.

—The school board of Pottsville, Pa., has raised the salary of Supt. G. H. Weiss from $4,500 to $6,000.

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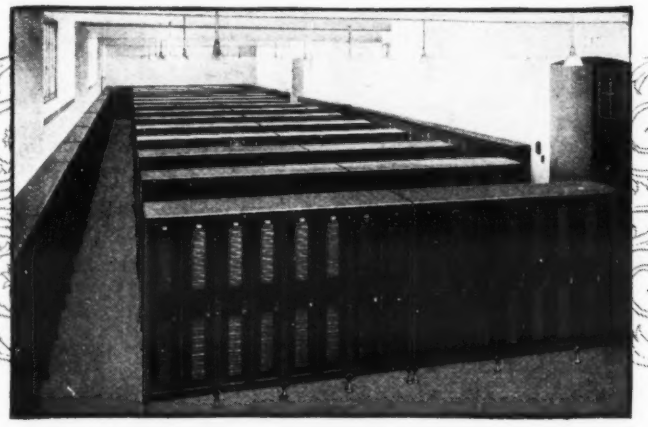

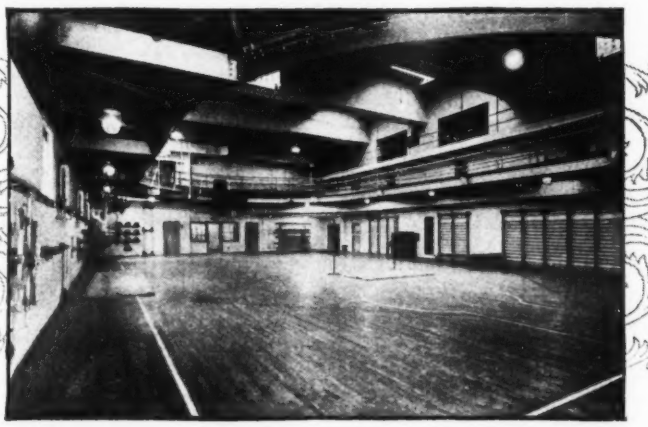

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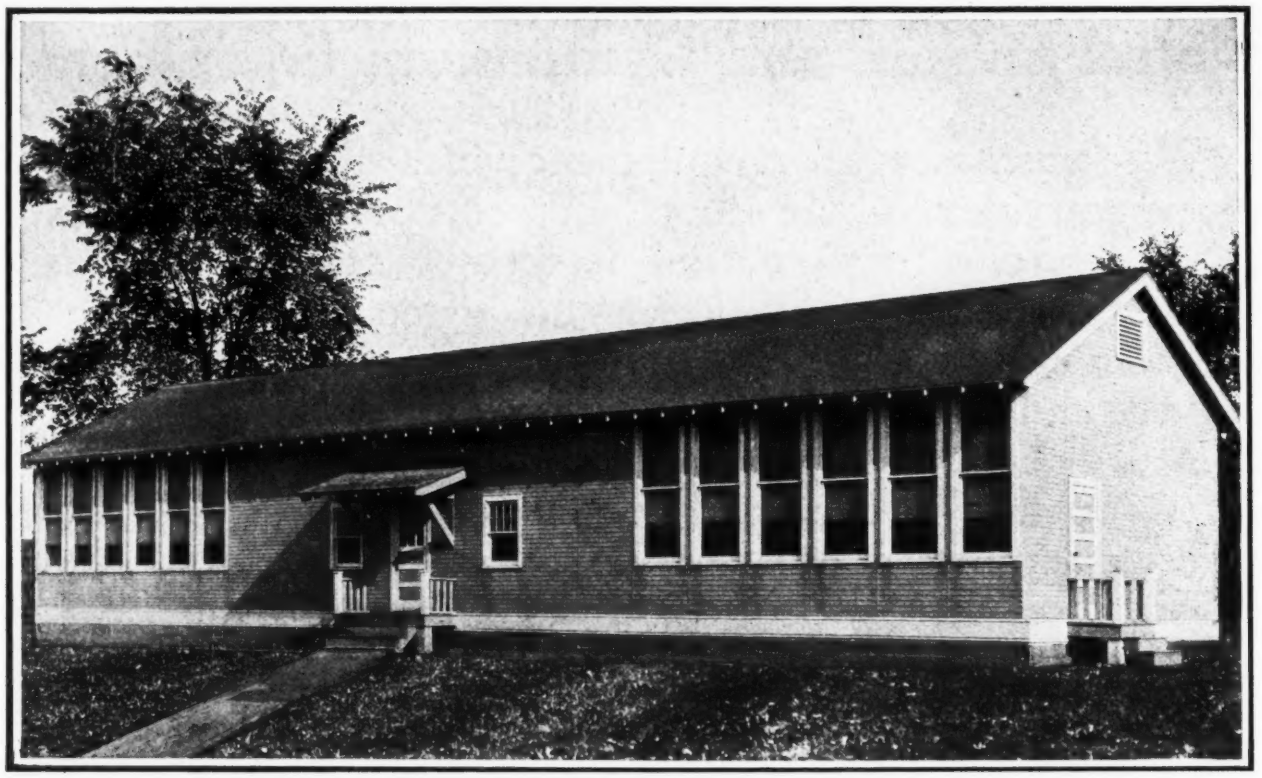

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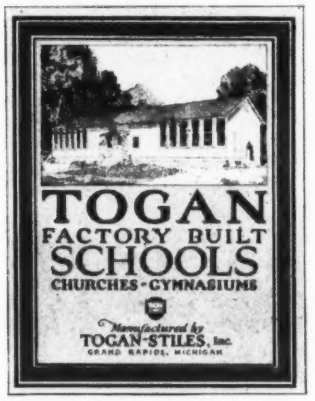

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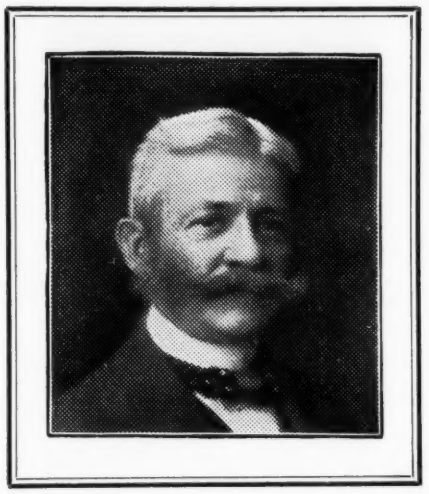

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STATISTICS OF STATE SCHOOL SYSTEMS

The United States bureau of education has issued a pamphlet dealing with statistics of state school systems. The work is done by Frank M. Phillips, chief of the division of statistics. Mr. Phillips notes that since 1924 the number of school buildings was decreased by 4,421 but the value of school property increased by $507,548,186. The total expenditures increased from $1,820,743,936 to $1,946,096,912. The following interesting paragraphs are taken from the pamphlet:

"The per cent which the school population (those of ages 5 to 17 inclusive) is of the total population has decreased from 31.3 per cent in 1870 to 26.6 per cent in 1925, but the per cent of population enrolled has increased from 17.8 per cent to 21.7 per cent in the same time.

"From 1900 to 1925 the population of the United States increased 50.11 per cent. The birth rate has been falling off, so that the population of school age has not kept pace with the general population The group of 5 to 17 years of age, inclusive, has increased 38.78 per cent, while the 5 to 14 age group increased 39.34 per cent. Total enrollments in public schools have increased 59 per cent during the past quarter of a century. The greatest increase is in the high school, 603.11 per cent, while the elementary-school enrollment has increased only 40.15 per cent, an increase slightly greater than the increase in the school census. The number of pupils in average daily attendance has increased 86.58 per cent during this period, and the number of teachers, 83.89 per cent."

The number of school buildings has increased only 4.26 per cent since 1900. This low increase is due largely to the fact that many one-room school buildings have been replaced by union, consolidated, or centralized schools, one new building taking the place of four or five smaller buildings. The number of one-room schools is smaller by 37,175 than it was in 1918.

Original costs generally determine the value of school properties, so that inflated values do not account for any part of the increase in value. The value in school property has increased 673.05 per cent during the past 25 years. This shows that larger and better buildings must have replaced smaller buildings of lesser value.

Mr. Phillips likewise shows the increased service rendered by the schools. He shows in several graphs that the length of session attended by those enrolled in the schools was increased during the period of from 1900 to 1925 by 17.53 per cent, and in number of days attended by 37.88 per cent. He says:

"The average number of days of attendance by those of school age increased 57.66 per cent during this period. In 1900, public schools were in session for 144.3 days. In 1925, the length of session had increased to 169.6 days. During this period from 1900 to 1925, the average number of days attended by those enrolled increased from 99 to 136.5 days. The percentage of attendance increased from 68.6 to 80.5. During this 25-year period the percentage of the session not used by those enrolled decreased from 31.4 to 19.5.

"The enrollments in the high schools enumerate some striking figures. In 1915 the public-high-school enrollment was 1,561,556; in 1916, 1,710,872; in 1918, 1,933,821; in 1920, 2,199,389; in 1922, 2,873,009; in 1924, 3,389,878; and in 1925, 3,650,903. An estimate based upon these figures indicates that the high-school enrollment for 1925-26 will reach 4,000,000 and for 1926-27, 4,300,000. These figures do not include junior-high-school pupils below the traditional ninth grade.

"The regular high-school enrollment in 1900 was 8.47 per cent of the number of children in the United States of ages 15, 16, 17, and 18. In 1905 it was 10.12 per cent; in 1910, 12.53 per cent; in 1915, 20.96 per cent; in 1920, 28.94 per cent; and in 1925, 47.11 per cent. The high-school enrollment can more than double and still not include all children of high-school age. It is not likely that this limit will ever be reached, but the break in the increase in high-school enrollment has not as yet begun."

In discussing some problems of school support, the expert says:

"States having a low per-pupil expenditure for schools generally have a high percentage of children in the total population. South Carolina has 33.85 per cent of her population in the school ages 5 to 17, inclusive, and a per-capita expenditure for each pupil in average daily attendance of $46.68. For Mississippi these amounts are 33.01 per cent and $29.97; for North Carolina, 32.78 per cent and $59.99; for Alabama, 32.77 per cent and $32.87; for Georgia, 32.23 per cent and $31.89; for Arkansas, 32.17 per cent and $29.11; for Louisiana, 31.01 per cent and $61.98; and for Tennessee, 30.28 per cent and $37.73. A high percentage of children means a low percentage of adults to support schools. In the states mentioned above, the percentage of the population 21 years of age and over ranges from 46.33 to 51.96. Annual per-capita income in these states ranges from $346 to $438. Per-capita wealth ranges from $1,216 to $1,855. The average per-capita income in the United States is $627, and the per-capita wealth is $2,918.

"States having a high per-pupil expenditure generally have a low percentage of children of school age. In the District of Columbia, only 17.71 per cent of the population are of school age, and the expenditure per pupil in average daily attendance is $148.98. For California these amounts are 19.82 per cent and $164.90; for Nevada, 19.92 per cent and $163.97; for New York, 22.74 per cent and $162.71; for Washington, 22.80 per cent and $112.92; for Ohio, 32.12 per cent and $112.31; for Michigan, 23.77 per cent and $138.96; and for New Jersey, 24.33 per cent and $154.62. The percentage of the population 21 years of age and over in these states ranges from 60.14 to 69.76 per cent. Annual per-capita income ranges from $690 to $887. Per-capita wealth ranges from $2,883 to $6,998 in these states."

DEMANDING THE TRUTH

If the cynicism of youth is the kind which does not sneer but which on the contrary asks for figs not thistles, demands truth not veneer, then it will be attended with no great danger; if youth still wishes to learn and is willing to pay the price of learning and at the same time does not seek the destruction of tradition and convention merely for the sake of destroying them; if it will pay heed to the wisdom of the ages and profit by the advice of the sages, then will cynicism give way to insurgent realism. The determined demand to know the truth is nothing but the manifestation of a healthy mentality whose glorious fruitage is yet to come.—President L. D. Coffman, University of Minnesota.

The Problem of Flooring in Schoolhouses

A Discussion on Hardwoods for Class and Other Schoolrooms

Julius W. Miller

It is probably safe to say that no class of buildings has received more careful study in point of planning and materials of construction than the modern schoolhouse. The specific use to which school buildings are subjected has not only centered thought upon orientation and the most advantageous arrangement of interior floor spaces, but also upon the materials employed in the construction of roofs, walls, floors, and stairways. The tendency on the part of architects and school officials to experiment with various new materials, and the competitive spirit of the manufacturers to produce a better article, has led to some surprising improvements.

Thus, the school building, as exemplified in the United States today, embodies to a higher degree, the best achievements in the field of construction, than any other class of public buildings, except perhaps hospitals. This is in part due to the fact that the total number of schools built every year exceeds by far the total of all other public buildings, but more largely to the fact that the efficient operation of school plants logically contemplates all the economies which science and mechanical skill may have evolved.

It is, therefore, not a surprise to find that the subject of flooring, which constitutes an important factor in any structure, but particularly in a schoolhouse, should have come under the scrutiny of technical experts. No part of a school structure is subjected to more strenuous wear and tear than the flooring. Children walk incessantly and without any regard for the material they walk on in corridors, stairways, and classrooms. Floors have received attention which their importance amply merits.

Youthful Feet Hard on Floors

This leads us to analyze the use of flooring materials in their relation to schoolhouse use. Here we find many youthful feet, much walking, much shuffling, some running and skipping, and even dancing. Pupils and teachers remain in the classrooms for long periods; they merely pass through corridors and up or down stairways; they play, dance, and march in the kindergarten; they exercise, play, and dance in the gymnasium. The floor material in each type of room ought to combine a wide range of qualities to meet a considerable number of basic considerations and needs. The considerations which come into play for classroom floors may well be taken up under nine heads.

First, the floor must be *comfortable for the feet,* neither too hard nor too soft to walk upon. If it is a rapid conductor of heat, it will likely carry off too much body heat, and the feet of both children and teachers will be readily chilled in cold weather. Such a condition interferes seriously with study and eliminates from school use such materials as concrete and terrazzo.

A second consideration is *reasonable noiselessness in movement.* A schoolroom does not require the quiet of a hospital room, but it is highly desirable that sound reverberations be reduced to a reasonable minimum for efficiency in instruction.

Durability of wear is the third factor which architects and school authorities seek to build into school floors. Children submit the floor to heavy wear, particularly at the doorways and under the desks. School furniture is often screwed down and the floor material must resist the pressure on the screws which the wiggling of restless youngsters makes almost continuous. Where movable furniture is used, the floor must resist the wear of carelessly shifted chairs and tables which children drag or push, but never carry.

Sanitary qualities constitute a fourth essential which hardly requires discussion. Any material which harbors dirt and vermin, or which cannot be cleaned readily, eliminates itself from consideration.

A fifth essential of classroom floors is *labor-saving quality* in sweeping, scrubbing, and other cleaning operations. Schools are never able to afford janitorial service that will make it possible to keep the floors as spotless as those in the homes. Children track in mud and dust from the playground, and their shuffling, restless feet literally grind the dirt into the floors. School authorities in the large cities well know that badly worn floors in old school buildings require the employment of additional cleaners and become a problem of daily expense. Probably the most discouraging and labor-wasting floors are old, splintered, flat-grained floors of softwood, with their wide cracks and numerous crevices.

Safety is a sixth factor which deserves consideration. Children are heedless, thoughtless, and hasty, and suffer more falls than staid adults. There is a growing recognition of the need for making the walkways, particularly in schools, safe against the danger of falls. Materials like concrete and terrazzo require some antislipping material mixed with the other ingredients.

A seventh factor is *economy in upkeep and repair.* Schoolroom floors suffer excessive use at doorways and at other points, and floors which cannot readily be repaired are not suitable for classroom use. Floors, too, are rather expensive in requiring frequent repairing or resurfacing, and floors which cannot very readily be treated annually do not deserve consideration.

The eighth requirement for schoolroom floors is *beauty in color and texture.* This element we generally overlook, and many otherwise beautiful schoolrooms are marred by unattractive floors. No matter what the material used may be, the element of good color deserves some consideration.

The ninth and final quality for all floors is *economy in installation.* While in the best sense school buildings are an investment for the future, most public authorities and most taxpayers look upon them as an expense at the time when bonds are to be issued or taxes levied. School boards insist that every detail of a building must be as low in cost as possible, consistent with needs and true economy. Numerous flooring materials are automatically eliminated from consideration because of this one main factor.

The balance of this paper is limited to a discussion of the use of hardwood for schoolroom floors and will suggest reasons why this material qualifies under the nine requirements just outlined.

Hardwood is nature's own material for floors. This is especially true of schoolrooms which in the nature of the case cannot be covered with carpet or other covering material. "The range of choice as to cost, figure, hardness, color, and durability is extensive," says a writer in *American Forestry.* "When all of these factors are considered, wood is found to head the list of floor materials in this country. If it does not occupy that position in some other countries, it is because of wood scarcity."

It is contended, with reason, that tile or concrete floors have their uses for fireproof corridors, that slate or concrete is best suited for fire-resisting stairways, and that tile or asphalt may serve best in toilet rooms, but it remains that for classroom flooring, no other material has had quite the acceptance for economy and utilitarian purposes as hardwood. In fact, when the entire range of flooring is considered, it is found that hardwood flooring leads for classroom use in the American schoolhouses.

Hardwood qualifies for schoolroom use in the matter of comfort; it is a poor conductor of heat and does not warrant criticism as a "cold" flooring material. It is, in the second place, reasonably noiseless, especially when compared with mineral products.

Hardwood, in the third place, is durable in withstanding the heavy wear of school use. An authority on the subject says that: "A good maple floor, if properly cared for, should last as long as the building. Maple, because of its tough fibers, has the quality of taking on a polish under use, thus setting up its own resistance to wear. Tests of wearing qualities for four common flooring woods made by a large association of manufacturers give first place to maple; next, birch; third place to beech, and fourth place to quarter and plain-sawed oak. It should be added that the difference is not very marked, and oak stands up very well.

The sanitary qualities of hardwood have never been questioned, except when floors have been carelessly laid, with wide, open seams. When the wood is properly seasoned and kiln dried, and is laid with due attention, every hygienic demand will be met. It should be said, however, that the open-grained hardwoods are less desirable than the close-grained maple.

The labor-saving qualities of hardwood floors are appreciated only by school janitors who have worked in buildings where old, splintered boards of softwoods slow up the sweeping and scrubbing operations. But hardwood floors do require preservation, as Mr. M. S. Olson, of the Janitor-Engineer Training School of Minneapolis, says in the AMERICAN SCHOOL BOARD JOURNAL of February, 1927, that:

"Hardwood floors are in almost universal use in the school buildings of this country and to make them a building investment, they must be preserved. Constant scrubbing serves to rob them of their natural oil and gum, and rapidly ruins them. Proper preservation and maintenance, on the other hand, will find them beautiful and serviceable long after the first cost of the building has been forgotten. Improper treatment can only result in unsatisfactory appearance, short life, heavy maintenance expense, and early refinishing or replacement."

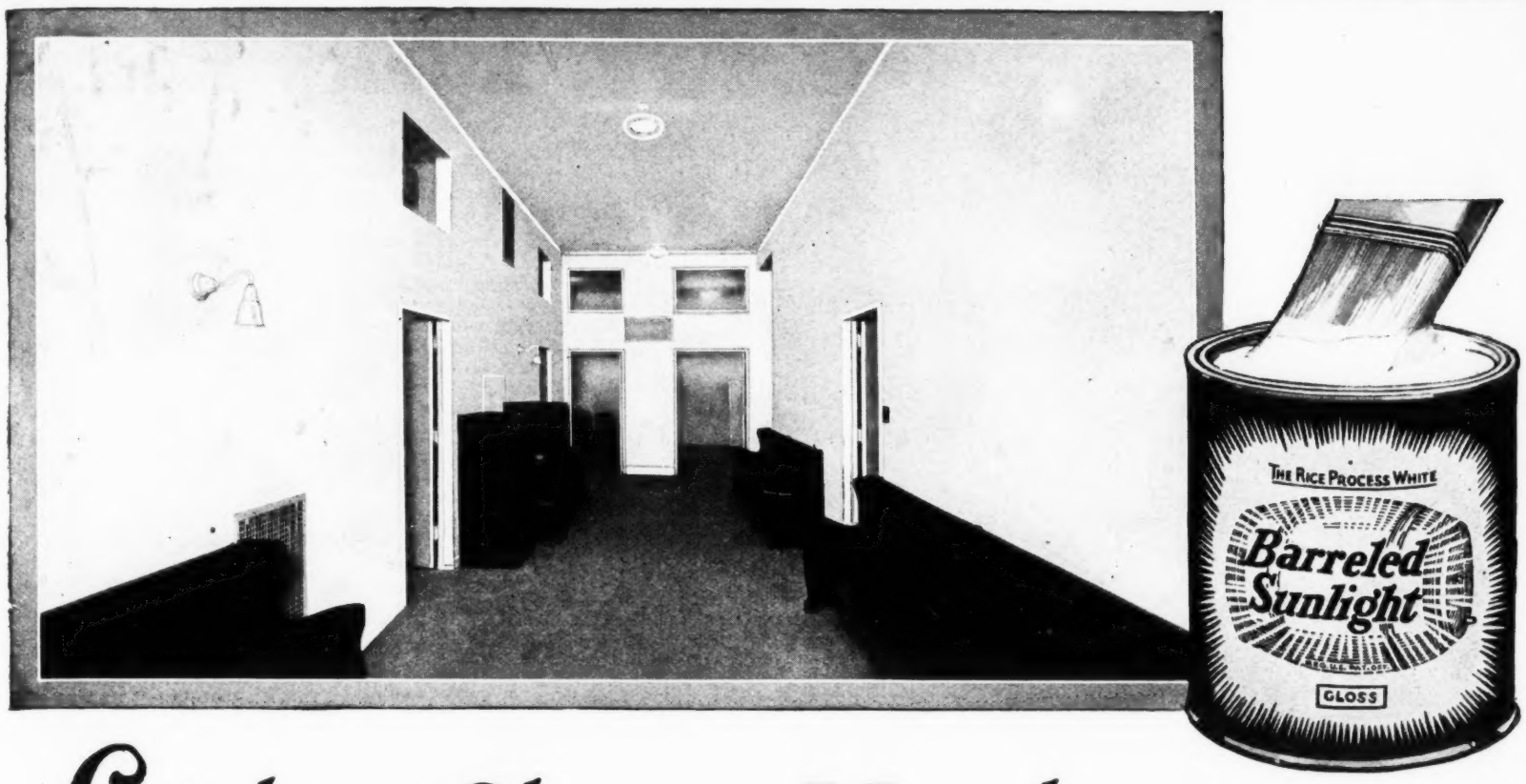
The factor of safety is well taken care of by nature in all hardwoods, which in their natural state are neither slippery nor markedly resistive to natural movement in walking. Only when an excess of floor oil or wax is added as a dressing, is there danger of slipping or stickiness.

Speaking of the economy of upkeep of hardwood floors, one authority says: "Maple wood is tough, strong, dense, and very hard. It will take high polish, wears evenly, never shells, splinters, or disintegrates from ordinary uses in any manner whatever, and is extremely durable when not placed in contact with the soil. The color of the heartwood is brownish and the sapwood which predominates, is much lighter. The structure is compact and the grain close—occasionally curly or birdseye. It possesses vital tenacity and ability to resist pointed pressure without abrasion; it is unexcelled for flooring and it is known to experts as having from two to three times the wearing tenure of other woods commonly utilized for flooring purposes."

Laboratory Tests of Hardwoods

The laboratory tests made show what maple is the hardest of the commercial hardwoods. One of the recent tests conducted by the United States Bureau of Standards to determine the holding powers of wood screws in which more than 10,000 tests were made, demonstrated that

(Concluded on Page 138)



Light · · Clean · · Handsome · ·

for months and years without repainting

Washable!

The satin-smooth surface of Barreled Sunlight Gloss has no pores to hold dirt embedded. It washes like tile. And it is so durable that frequent washing will not injure its lustrous beauty

HUNDREDS of schools have found that Barreled Sunlight combines all the qualities most desirable for painting interior walls and woodwork. They are using this smooth, clean, lustrous finish to replace both ordinary paint and expensive enamel.

Three different finishes, all easily tinted, make Barreled Sunlight available for every interior painting job.

Where maximum light and sanitary cleanliness are essential—in lavatories and corridors—and on woodwork—Barreled Sunlight Gloss is the established favorite. Its light-reflecting surface is so smooth it washes like tile, and so durable that repeated washings will not wear it away. Comparable only to the most expensive enamel, it costs less and requires fewer coats.

For places where less than the full gloss is desired, Barreled Sunlight Semi-Gloss is widely approved. It has a still softer lustre than the Gloss and is as easily washed.

And for the duller effect sometimes preferred on walls of well-lighted rooms, Barreled Sunlight Flat meets every requirement. Extremely attractive, this finish is also washable—though naturally less durable under constant washing than the Gloss or Semi-Gloss.

Barreled Sunlight is so opaque, and so easy to apply with brush or spray, that it requires the minimum amount of labor to complete any given job.

Sold in 55- and 30-gallon churn-equipped drums, and in cans from ½ pint to 5 gallons. Where more than one coat is required, use Barreled Sunlight Undercoat first.

There is a local distributor of Barreled Sunlight in all principal cities. Mail the coupon for further information and a sample panel painted with Barreled Sunlight.

U. S. GUTTA PERCHA PAINT CO.

Factory and Main Offices
44-A Dudley Street, Providence, R. I.
New York—420 Lexington Avenue
Chicago—659 Washington Blvd.
San Francisco—156 Eddy Street

Distributors in all principal cities
Retailed by over 7,000 dealers

Easy to Tint Any Shade

Barreled Sunlight, an all-oil product, is easy to tint any desired shade by simply adding ordinary colors-in-oil. On the smaller jobs many painters are using the new Barreled Sunlight Tinting Colors, in handy tubes. In quantities of 5 gallons or over, Barreled Sunlight is tinted to order at the factory, without extra charge.

Barreled Sunlight

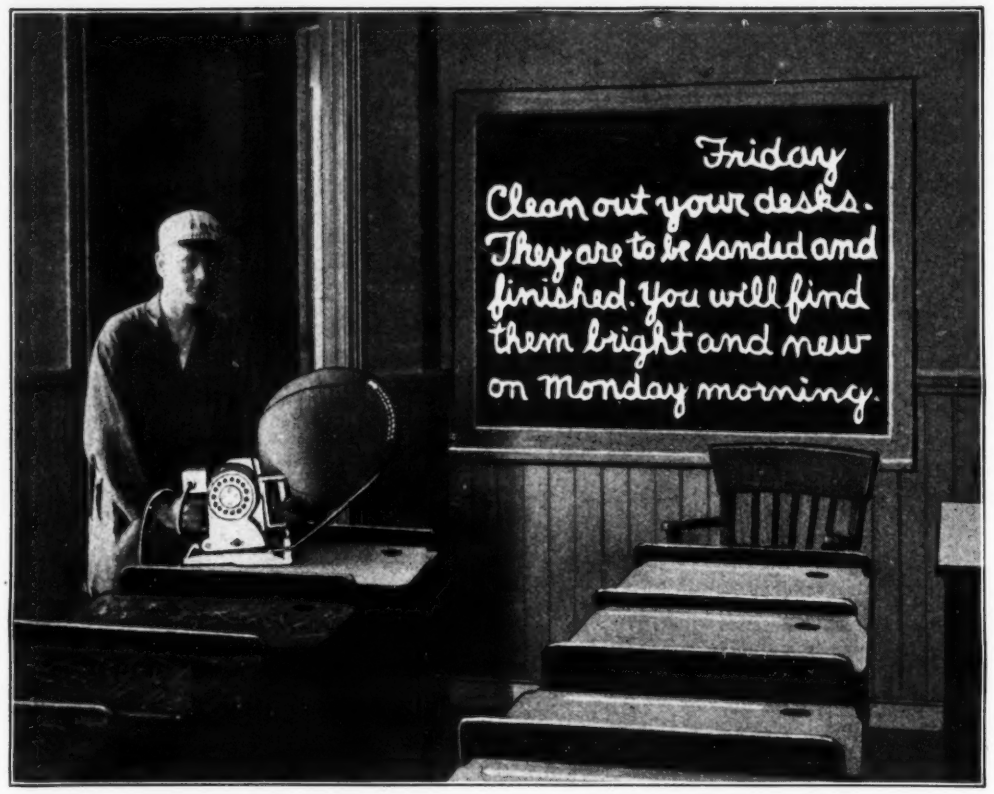
Reg. U. S. Pat. Off.

U. S. GUTTA PERCHA PAINT CO.
44-A Dudley Street, Providence, R. I.
Please send me descriptive literature and sample panel painted with Barreled Sunlight. I am interested in the finish checked here—
Gloss ( ) Semi-Gloss ( ) Flat ( )

Name.....

Street.....

City.....State.....



Lucky Kids!

Clean, smooth desk-tops! All the scratches, gouges, and scars erased away like magic. How much easier it will be for them to write! How much easier to study with all the eye-distracting cuts, initials, and scars gone.

Schools everywhere have found that pupils do their work better on smooth, clean desk-tops. These schools have Clarke Vacuum Portable Sanders, and get the work done over the week-end. No expensive hand-sanding, no messy varnish removers—the CLARKE whisks away the varnish, scars, and scratches, and reveals a smooth, clean surface. Because it's ***dustless*** in operation, varnishing need not be delayed. Over Sunday varnish dries—Monday morning, desks are ready.

During the week the Clarke is used for manual training, permitting instruction with a most modern industrial machine. It does practically all classes of sanding work — work that ordinarily would require several types of expensive stationary machines.

By all means find out how the CLARKE can make you big savings in maintenance work. Find out how it serves the Manual Training Department. What it has done for hundreds of schools—it can do for you. Get the facts—get them ***now!*** Use the convenient coupon!

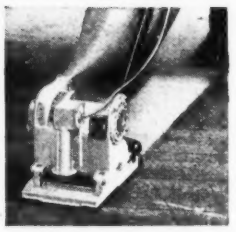
Clarke Sanding Machine Company

For 11 years Originators and Manufacturers of Portable Sanding Machines.

How the CLARKE quickly pays for itself

For maintenance work the CLARKE has no equal. Actually makes 120 to 200 old, scarred, desktops ***new*** in a day! With floor handle attached, it is a floor surfacing machine that will refinish 800 to 1600 square feet of new floor—or 300 to 800 of old, varnished flooring—to a beautiful smoothness in eight hours.

Does all this work at very little cost because it runs off any light socket in the classroom — no special wiring or big power bills. It is easily carried with one hand — it is ***absolutely dustless*** in operation. In all respects, the CLARKE is ideal for the school



POWERFUL - FAST CUTTING
CLARKE
VACUUM PORTABLE SANDER
TRADE MARK

CLARKE SANDING MACHINE CO.,
Dept. G-21, 3821 Cortland St.,
Chicago, Ill.

Please send me the facts on the Clarke Vacuum Portable Sander—with no obligation to me.

Name .....
Address .....
City ..... State .....

(Concluded from Page 136)

hard maple has the greatest resistance to withdrawal of the screws of different lengths and thicknesses. Other laboratory tests on impact bending also place maple to the head of the list. The one test has value in that it shows that school desks, laboratory or other equipment may be fastened to the floors.

An authority holds that "for many years nearly all school desks have been made of hard maple on account of their long-time service qualities, the firmness with which the fastenings maintain the rigidity of the desk and its parts, and incidentally because the absence of pronounced lines of grain avoids the suggestion to the student to mar the furniture by following out the lines with lead pencils or drawing tools."

Last year the Mellon Institute of Industrial Research, at Pittsburgh, conducted a series of abrasive tests of flooring materials. The test proved the superiority of maple flooring over linoleum. The average loss for maple wood was 23.79, while that for linoleum was 56.57.

The oak has always had its admirers; oakwood deservedly has its champions. The extraordinary strength of oak has been recognized in all ages, and many are the needs of industry and civilized life which are met only by oak. A writer on the subject says:

"Oak floors, of heavy rough-hewn boards, bore the weight of the armored knights of old; refined in design and laid in beautiful geometric patterns, they reflected the jeweled slippers of the ladies and gentlemen at the court of the French Louis, and even today the exquisite oak floors of Fontainbleau and Versailles are models for present-day craftsmen. In our own Colonial period, we find Thomas Jefferson advising his homefolk by letter to put the oak in the kiln, to be ready for flooring upon his return. Mostly plain-edged boards, in some cases lapped; often with double-groove and loose tongue, the ancestor of the modern tongue and groove—sturdy oak flooring was the foundation of charming interiors in homes during the Revolution."

The durability of an oak floor cannot be questioned. It is properly said to last as long as will the building in which it is placed. Its beauty of grain and color, as well as serviceability, is admitted.

A discussion of the subject of hardwood flooring as applied to schoolhouse use would be incomplete without some mention of the accomplishments made in the scientific and artistic treatment of such hardwoods. The enterprising manufacturer has not only sought to strengthen flooring through stains which toughen the fiber of the wood, but also to lend a new dignity and beauty to the floor.

The remarkable progress made in floor stains is shown in the variety of tints and shades which have been developed. These are especially adapted for dwellings, but in several shades, tans, greens, and grays are of especial interest for classroom use. These harmonize rather well with the usual schoolroom colors and are of the penetrating type so that the floor can suffer some wear before the color wears off. If protected with a brushing lacquer of the new kind, applied with a lintless cloth, the colors have surprising durability. The material will dry deeply into the wood and will thoroughly waterproof it. Another coat should be put on in the same way about twelve hours afterward, and the floor may be walked on over night.

Supremacy of Nature's Products

There is a growing tendency in this country to distinguish between the natural thing and the artificial. Science has produced some ingenious substitutes for many of the things that enter into the economy of industry and social life, but when it comes to wood products, nature has thus far rendered the best service and unquestionably will continue to do so.

Thus, we are brought to the conclusion that human ingenuity has accomplished wonders in transforming the gifts of nature so that they may serve the uses of man; science has found marvelous combinations of substances and ingredients and thereby effected substitutes which are more utilitarian and at the same time cheaper than the natural thing, but science knows, too, when artifice cannot improve upon nature.

Thus, nature's own products, as to substance, and unchanged as to attractiveness, serve whenever in man's exigencies it may serve best. Hardwoods will always have a place in the modern school structure so long as these are inhabited by live, active, and virile youth. It seems, therefore, reasonably evident that in considering the problem of classroom floors, hardwood is at once the most utilitarian, practical, and economical, and will, therefore, continue to lead in American schoolhouse service.

MR. SEXTON GOES TO PASADENA

Mr. John A. Sexton, formerly superintendent of schools at Bisbee, Ariz., on January 1, took over the superintendency at Pasadena, Calif. Mr. Sexton succeeds Mr. John F. West, who will serve as deputy superintendent until next June when his one-year term expires.

Mr. Sexton is a graduate of Franklin Academy of Franklin, Nebr., of the Colorado Normal School of Greeley, and Denver University, and has taken special work at Columbia University and the University of Colorado. He has had considerable experience as an instructor in colleges of education and in summer schools, and during 1925-26 was a summer-school instructor at the University of Arizona.

Mr. Sexton is president of the Southeastern Arizona Education Association and is a frequent contributor to educational periodicals.

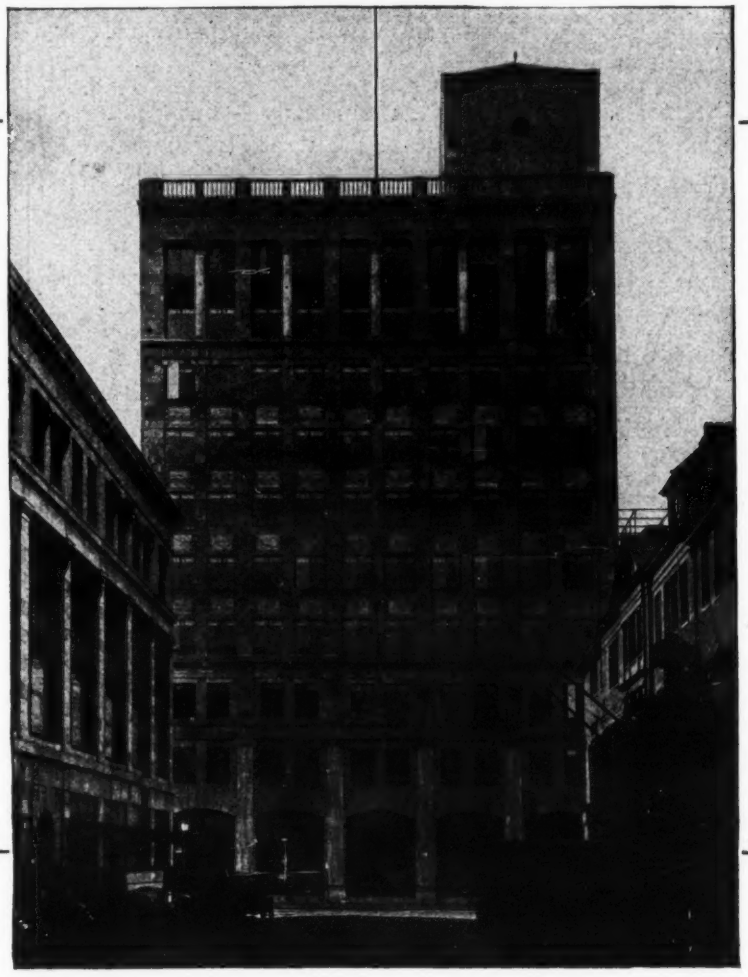
ROCHESTER GAS & ELECTRIC CO. BUILDING

ROCHESTER, N. Y.

Gordon & Kaelber, Rochester, *Architects*

A. W. Hopeman & Sons, Rochester, *General Contractors*

Par-Lock Specification "Form B" applied to interior of all outer walls by Par-Lock Appliers of Western New York.



Concrete or other masonry
Plus gun-driven asphalt coats
Plus an imbedded coating of grit
Makes the Par-Lock base, ideal for plastering

Interior Permanence

JUST as the expansion joint safeguards concrete, the *cushioned key* of Par-Lock saves interior plaster from cleavage strains due to unequal expansion and contraction in the plaster and the structural surface.

More than this, Par-Lock safeguards against moisture—that mortal enemy of fine interiors—whether from wall leakage or from condensation.

There is a Par-Lock applier conveniently located to service your own forthcoming building.

THE VORTEX MANUFACTURING CO., 1987 West 77th St., CLEVELAND, O.

Par-Lock
PLASTER KEY

Write to the nearest Par-Lock Applier

ALBANY, 425 Orange Street.
BALTIMORE, 613 West Cross Street.
BOSTON, 45 Commercial Wharf.
BUFFALO, 958 Ellicott Square Bldg.
CHICAGO, 122 S. Michigan Ave.
CLEVELAND, 404 Hunkin-Conkey Bldg.
COLUMBUS, 751 South Cassingham Rd.
DETROIT, 2511 First National Bldg.
KANSAS CITY, MO. 2035 East 19th St.
MINNEAPOLIS, 200 Builders Exchange.
NEWARK, N. J. 24 Commerce Street.
NEW YORK CITY, 50 Church Street.
PHILADELPHIA, 1700 Walnut Street.
PITTSBURGH 207 Fulton Bldg.
SCRANTON, PENNA. Cedar Avenue.
ST. LOUIS, 515 Chemical Bldg.
TORONTO, 2258a Bloor Street, West
TRENTON, 339 Broad St. Bank Bldg.
YOUNGSTOWN, 503 City Bank Bldg.
WILKES-BARRE, PENNA. 904 Second Nat'l Bank Bldg.

PAR-LOCK CORK INSTALLATIONS, United Cork Companies, Lyndhurst, N. J.

P-17

All These Advantages

— are gained when you install Rundle-Spence Vertico-Slant Fountains.

The thirst of all is satisfied sanitarily — **lips can't touch the R-S nozzle**—the slight slant stream prevents water from falling back upon the jet. R-S Fountains take up little space, and check the waste of water. They give continuous service the whole year 'round, and add new beauty to their surroundings.

The R-S line includes Sanitary Drinking Fountains, Bath and Plumbing Fixtures and Supplies. Write for catalog with complete information.

RUNDLE-SPENCE MFG. CO.
51 Fourth St., Milwaukee, Wis.

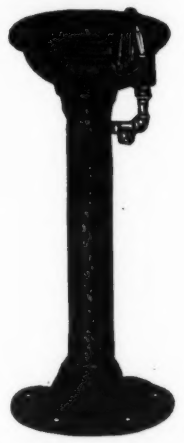
RUNDLE-SPENCE

C 92

Handsome vitreous china one piece fountain. Combines all the conveniences of the vertical stream with the special slanting stream feature. Glass or cup may easily be filled from it.

C 147

A pedestal fixture of galvanized pipe with extra heavy vitreous China bowl and vertico-slant stream. An extra strong fountain for the playground.



TEACHERS' LICENSES IN THE DISTRICT OF COLUMBIA

The District of Columbia board of education has recently approved revised regulations relative to the granting of teaching licenses for positions in public schools under its jurisdiction.

Under these every candidate for a license to teach in the public schools of the District of Columbia must submit satisfactory certified documentary evidence from the proper authorities as to the following: (*a*) that he is a bona fide citizen of the United States or that he has already taken out papers to become a naturalized citizen of the United States and has taken all steps necessary to complete his naturalization up to the time of entering the examination; (*b*) that he is of good moral character; (*c*) that at the time of appointment he will not be over the age limit prescribed for his teachership as follows:

Senior High Schools (3A Salaries) and
Junior High Schools (2C Salaries) . . . . 45 years

All other teacherships . . . . . 40 years

(*d*) that he is a graduate of an accredited high school (or possesses the equivalent academic training) and has had the additional scholarship and educational and professional training prescribed, or which may be prescribed, for the license sought.

All candidates must take the examinations for the licenses in accordance with the rules and regulations specifically relating thereto in documents issued by the boards of examiners, viz:

A Written and Professional (or Practical) Examination covering in general the subject matter and the principles underlying instruction and activities in the field of work in the particular kind of school (elementary, senior high, etc.), in which the applicant is to teach.

An Oral Examination covering all or any part of the certified documentary evidence submitted, and all or any part of the written examination and matters pertinent thereto.

A Physical Examination under the auspices of the health officer of the District of Columbia.

Licenses to teach shall be issued to successful candidates. Such a license shall be good for not more than two years from the date of the placing by the board of education of said candidate's name on merged list.

The list of licenses is as follows:

I. Kindergartens:
To teachers in kindergartens.
II. Elementary Schools:
To regular classroom teachers,
Grades I to VI inclusive.
III. Elementary Schools:
To regular classroom teachers,
Grades VII and VIII.
IV. Elementary Schools:
To teachers of special subjects,
other than grade subjects,
Grades I to VIII inclusive.
V. Elementary Schools:
To teachers of trade subjects,
e.g., painting, plumbing, printing,
sheet metal, woodworking, etc.
VI. Junior High Schools:
To teachers of academic subjects.
VII. Junior High Schools:
To teachers of special subjects,
other than trade subjects.
VIII. Junior High Schools:
To teachers of trade subjects.
IX. Junior High Schools:
To teachers of academic and scientific subjects.
X. Junior High Schools:
To teachers of special subjects.
XI. Senior High Schools:
To teachers of academic and scientific subjects.
XII. Senior High Schools:
To teachers of special subjects.
XIII. Normal and Senior High Schools:
To Librarians.

The specific eligibility requirements as to licenses, in addition to those above, are as follows:

I. Kindergartners: To teachers in Kindergartens, the additional eligibility requirements over and above those provided in the preceding sections are:

1. A diploma from an accredited normal school requiring a two-year course, at least one-third year of which course shall have been devoted to kindergarten methods; or certificate of similar courses pursued in the educational department of an institution of learning approved by the boards of examiners and

2. Ability to play the piano.

II. Elementary Schools: To regular classroom teachers, Grades I to VI inclusive, the additional eligibility requirements are:

A diploma from an accredited normal school requiring a two-year course; or certificate of similar courses pursued in the educational department of an institution of learning approved by the boards of examiners.

III. Elementary Schools: To regular classroom teachers, Grades VII and VIII, the additional eligibility requirements are:

1. A diploma from an accredited normal school requiring a two-year course; or a certificate of the equivalent normal training. *Provided*, that after July 1, 1928, the above alternative shall be: Certificate of similar courses pursued in the educational department of an institution of learning approved by the boards of examiners, *or*

2. Accredited college work aggregating credits for at least two years with at least two professional courses or courses in education all successfully pursued in an accredited institution of learning within ten years immediately preceding the date of the examination.

IV. Junior High Schools: To teachers of academic subjects who are required to possess the elementary-school qualifications and such additional eligibility requirements as may be prescribed, the additional eligibility requirements are:

a) The additional eligibility requirements prescribed for License III, except for teachers on active service in the elementary public schools of the District of Columbia who are exempt therefrom.

b) The submission of a certificate for a general junior-high-school methods course successfully pursued in an accredited institution of learning within the ten years immediately preceding the date of the examination.

V. Junior High Schools: To teachers of academic and scientific subjects, who are required to be graduates of an accredited college; or to be graduates of an accredited normal school with five years of teaching in a (senior) high school, the additional eligibility requirements are those specified under License XI for academic and scientific subjects in senior high school, provided that one of the two accredited college courses in education of professional courses there required under (2) must be in general junior-high-school methods.

The list of academic and scientific subject majors (one of which is to be selected) is the same as under License XI for senior high schools, omitting biology, chemistry, and physics.

VI. Junior High Schools: To teachers of special subjects *who are required* to be graduates of an accredited college, or to be graduates of an accredited normal school, with five years of teaching in a (senior) high school, or "to possess like qualifications to those required of teachers of academic and scientific subjects in the (senior) high schools,"

(Concluded on Page 143)

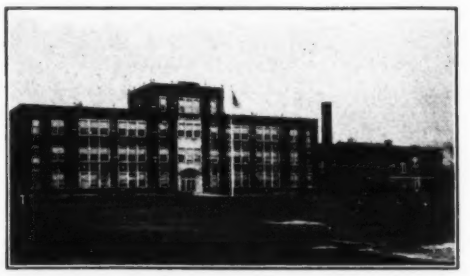
UNIVENT and Glass—*make the difference*

THE difference between the biting cold of winter winds, and temperature mild as May.

—The difference between hot, stuffy, fetid air, and air comfortably warm, and constantly freshened.

Above all others, school children need the benefits of Univent ventilation. Continuously warm air to ward off winter ills—*fresh* air to keep their growing minds alert.

The Univent—and only the Univent—is their protection. It brings in fresh, dust-free air, purifies it, heats it to a comfortable and healthful temperature, and circulates it gently and thoroughly throughout the entire room.



*York Community High School, *equipped with*...

UNIVENT (TRADE MARK)

VENTILATION

Often Imitated But Never Duplicated

In summer as well as winter, school children are assured of constantly freshened air.

Find out how the Univent gives such uniform results under all weather conditions. Find out the great savings it makes—savings so impressive, schools everywhere have adopted it. All this information comes to you in "Univent Ventilation"—a book that is sure to be of interest to you. Send for it.

*York Community High School, Elmhurst, Ill.
J. C. Llewellyn, Architect

Manufactured only by THE HERMAN NELSON CORPORATION, *Moline, Ill.*

Builders of Successful Heating and Ventilating Equipment for 20 Years

Sales and Service

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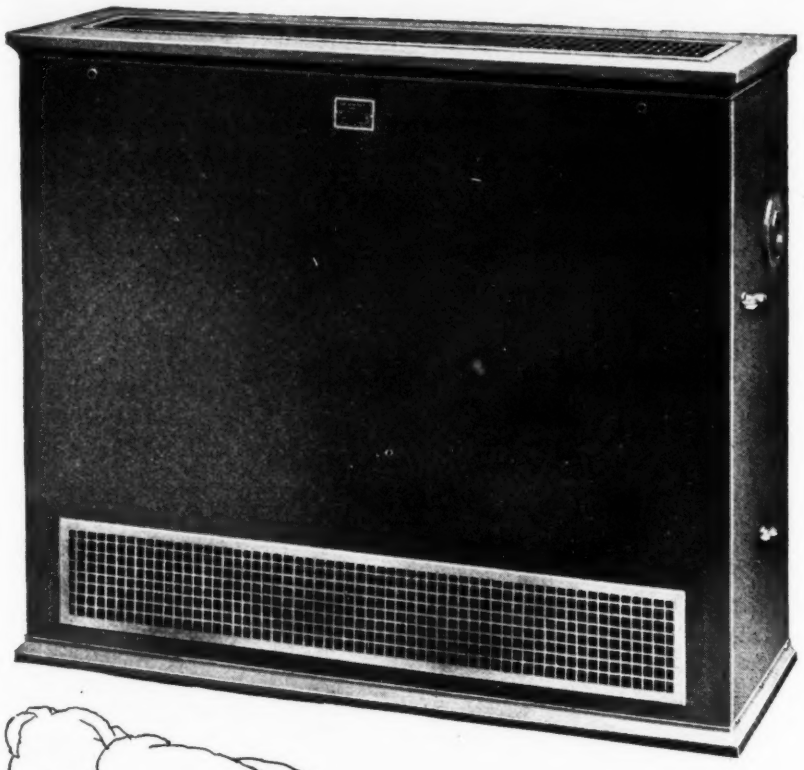
UNIVERSAL HEATING AND VENTILATING UNITS



The Hazelton High School, Lowrie & Green, Architects, Harrisburg, Pa.

Bad Air is Bad Business in Schools

"I refuse to teach that class another day," complains the irate teacher; "it's impossible to keep their attention for five minutes."

"My child is continually coming home from your school with a headache," writes the parent to the principal.

"Please excuse my son's absence during the past week; he was home with the Grippe," read innumerable excuses from fathers.

But what is usually the cause? Improper air conditions.

For over 15 years Universal Heating and Ventilating Units, sold by American Blower, have been properly heating and ventilating public schools. They are quiet in operation — simple in design — highly efficient—dependable from every angle — and economical.

Write today for our illustrated 112-page book showing country-wide installations of Universal Heating and Ventilating Units.

AMERICAN BLOWER CORPORATION, DETROIT
BRANCH OFFICES IN ALL PRINCIPAL CITIES
CANADIAN SIROCCO COMPANY, LIMITED, WINDSOR, ONTARIO

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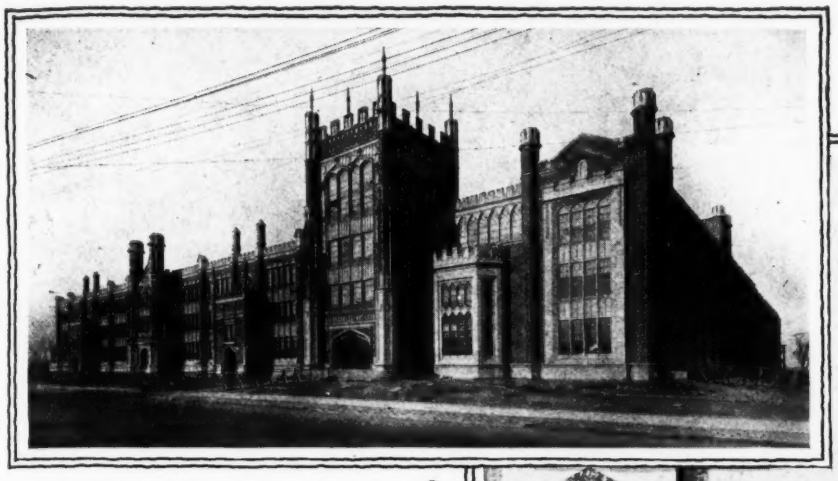
American Blower

"Sirocco" VENTILATING, HEATING, AIR CONDITIONING, DRYING, MECHANICAL DRAFT

MANUFACTURERS OF ALL TYPES OF AIR HANDLING EQUIPMENT SINCE 1881



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DONALD G. ANDERSON, ARCHITECT,
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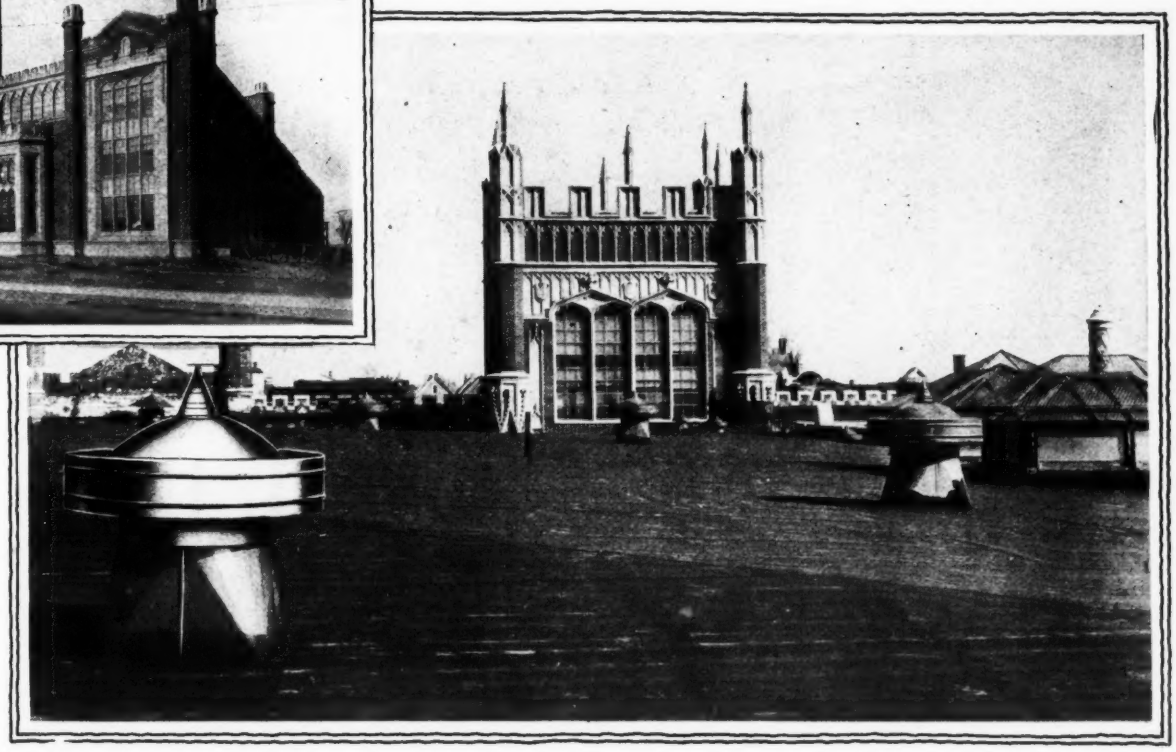

"GLOBE"

Ventilation For School Buildings

SO efficient have "GLOBES" proved themselves to be that many architects look upon them as the standard ventilation for schools. Thousands of successful school installations prove this to be true.

The ventilators on the Junior High School are sturdily constructed of heavy weight copper, making them practically everlasting. They are absolutely storm-proof and trouble-proof.

There is no upkeep expense and there are no moving parts to get out of order or to require lubrication.

"GLOBE" Ventilators furnish efficient ventilation for schools of all sizes, from the smallest frame portable school to the largest permanent building, such as pictured here. Your inquiries relative to the ventilation of any type of school will receive a prompt reply.

GLOBE VENTILATOR COMPANY

DEPARTMENT J TROY, NEW YORK

(Concluded from Page 140)

the additional eligibility requirements are those specified under License XII for senior high schools, provided that one of the two accredited college courses in education or professional courses there required under (3) must be in general junior-high-school methods.

VII. Senior High Schools: To teachers of academic and scientific subjects *who are required* to be graduates of an accredited college; or to be graduates of an accredited normal school, with five years of teaching in a high school, the additional requirements are:

1. A degree from an accredited college; or graduation certificate from an accredited normal school, such normal-school graduate to have had at least five years' experience as a teacher in a high school; and

2. Two accredited college courses in education, or professional courses successfully pursued in addition to or as part of the above eligibility requirements within the ten years immediately preceding the date of the examination, one of which must be a course in general senior-high- (or secondary) school methods.

VIII. Senior High Schools: To teachers of special subjects *who are required* to be graduates of an accredited college, or to be graduates of an accredited normal school with five years of teaching in a (senior) high school, or "to possess like qualifications to those required of teachers of academic and scientific subjects in the (senior) high schools," the additional requirements are: 1 and 3, or 2 and 3.

1. A degree from an accredited college; or graduation certificate from an accredited normal school, such normal-school graduate to have had at least five years' experience as a teacher in a (senior) high school.

THE RANK OF SCHOOL SYSTEMS IN NORTH CAROLINA

The latest communication of the state education department of North Carolina gives the rating of school systems in the state, the ranking of these systems being based on the composite score of ten educational factors relating to white schools only. The statistics are taken from the figures for the school year 1924-25.

In this report the scores for each of the ten factors have been omitted. Instead, the composite score for the first five, or academic, factors; the composite score for the second five, or financial, factors, and the complete score for all ten factors, have been presented for the three school years, 1923-24, 1924-25, 1925-26.

In the study, ten factors generally recognized as essentials of a school system have been taken as the basis. Each of these factors translated into an index would be perfect at 100. Thus, by adding either the first five or the last five of the factors and dividing the sum by five, the result will still be the basic score of 100 as perfect.

Briefly, the factors used and the standard for each factor are as follows:

1. Percentage of enrollment in average attendance. Attendance of 100 per cent is the perfect score of this factor.

2. Average length of the school term in days divided by two. A term of 200 days is taken as the standard, which divided by two gives the basic 100.

3. Scholarship of teachers' index divided by eight. The index is obtained by translating the academic and professional training of the teachers as evidenced by the certificates they hold into 100 points for each year's training above elementary-school graduation. Taking the highest score of 800 as the standard and dividing by eight the basic 100 is obtained.

4. Percentage of total enrollment in high school multiplied by four. Taking 25 per cent as the standard percentage and multiplying it by four, gives the basic 100.

5. Percentage of enrollment normal and under age for grade multiplied by 1.25. The normal distribution is taken as the standard in this factor. Taking 80 per cent as the standard for under-age and normal together, and multiplying this percentage by 1.25 gives the basic 100. These five factors have been designated academic factors because they have to do with general or noncost items. The average of these factors has been designated the academic index.

The next five factors pertain to expenditures and values, and have been designated financial factors. The average of these five factors has been designated the financial index. These factors are:

6. Average annual salary of teachers divided by twelve. An annual salary of $1200 is assumed to be a fair salary and is taken as the standard. Dividing this by twelve gives the basic 100.

7. Per-capita cost of instruction based upon enrollment multiplied by two. It is assumed that $50 per pupil per year is a satisfactory cost of instruction. This standard multiplied by two gives the basic 100.

8. Total per-capita cost of current expense based upon the enrollment multiplied by 1.33. It is assumed that $25 per pupil added to the standard cost of instruction would be a satisfactory standard per-capita cost of current expense. The sum, $75, multiplied by 1.33½ gives the basic 100.

9. Total current expense per teacher and principal divided by 24. A total of $2400 is assumed to be a fair amount to spend per teacher for current expenses per year. This is $200 per month per teacher. Dividing the $2400 by 24 gives the basic 100.

10. Valuation of school property per child enrolled divided by two. A valuation of $200 per child enrolled is assumed to be a fair standard, which divided by two, gives the quotient 100 as the basic score.

The average of all ten factors gives the general efficiency index. On the basis of these indices the systems have been ranked and divided into groups, called efficiency groups. Those systems having indices from 70 to 100 have been assigned to group A; those having indices from 60 to 70 into group B; those having indices from 50 to 60 into group C; and those having indices below 50 into group D.

Before discussing the table at the right it might be well to show the scores in all ten factors for the state as a whole for the three years under consideration:

Factor	1923-24	1924-25	1925-26
1	74.7	76.4	76.8
2	73.1	73.8	74.5
3	66.7	69.0	72.4
4	43.6	48.0	52.0
5	65.7	66.4	68.5
Average	64.8	66.7	68.8
6	66.6	69.6	71.1
7	48.1	50.7	51.1
8	39.8	41.7	45.8
9	41.4	42.9	46.2
10	48.9	56.7	65.3
Average	49.0	52.3	55.9
Gen. average	56.9	59.5	62.4

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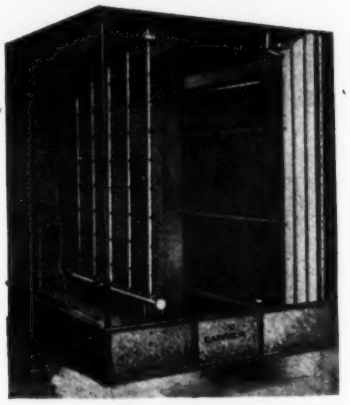

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The New Pawtucket Senior High School, Pawtucket, R. I., uses five Buffalo Duplex Conoidal Fans and two Carrier Air Washers.

In the table progress is noticeable in each of the factors for each year. The total gain of 1924-25 over 1923-24 is 2.6, whereas the total gain of 1925-26 over 1924-25 is 2.9. In ten years it is estimated the same rate of progress will show a transformation in the educational life of the state. There is a parallel gain in the average financial index and the average academic index, the greater gain in the second year in both cases, thus indicating there is a close relation between the two sets of factors.

In the total city systems the average academic index gained one point from 1924-25 to 1925-26; the financial index lost 1.1 points during this time, and the general efficiency index lost .1 of a point.

The significant feature of the comparisons is not so much the increasing of the indices, as it is the difference in the rural and city indices. Restated these indices are:

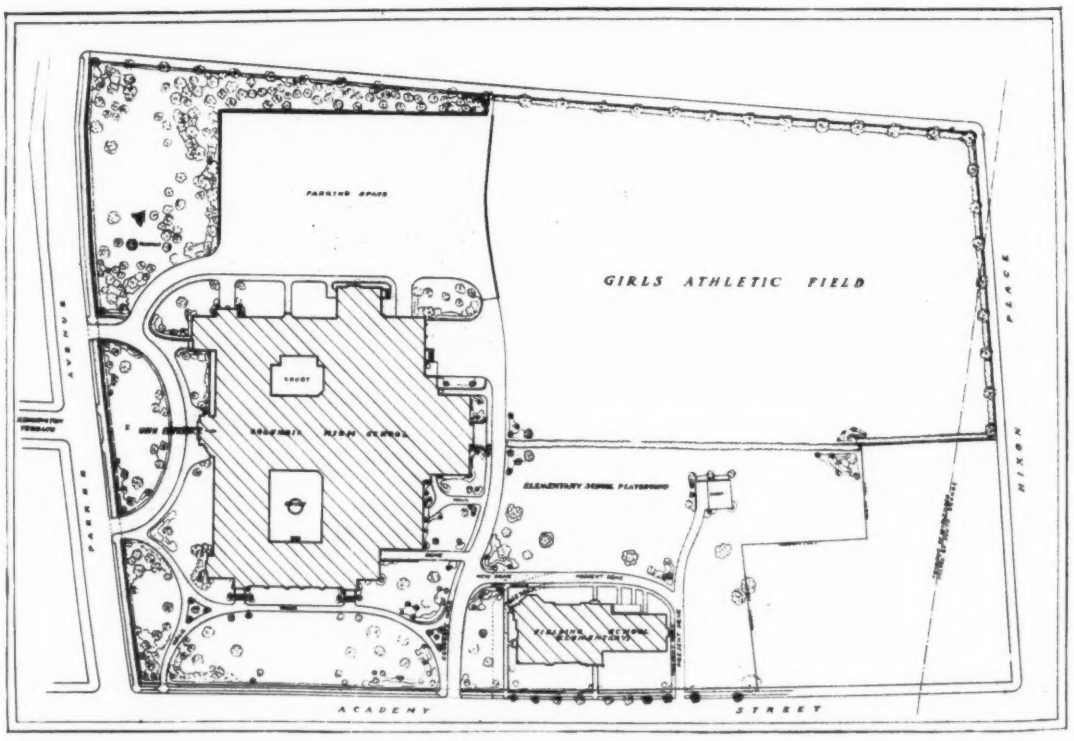
		Rural	City	Difference
Academic	1923-24	61.0	83.5	22.5
	1924-25	63.2	84.9	21.7
	1925-26	65.5	85.9	20.4
Financial	1923-24	39.3	78.7	39.4
	1924-25	42.9	82.9	40.0
	1925-26	46.3	81.8	35.5
General	1923-24	50.1	81.1	31.0
	1924-25	53.1	83.9	30.8
	1925-26	55.9	83.8	27.9

The last column in the table shows beyond a doubt that the inequalities existing between rural and city systems are slowly becoming less pronounced, and that this fact is caused by greater increased indices in the rural system.

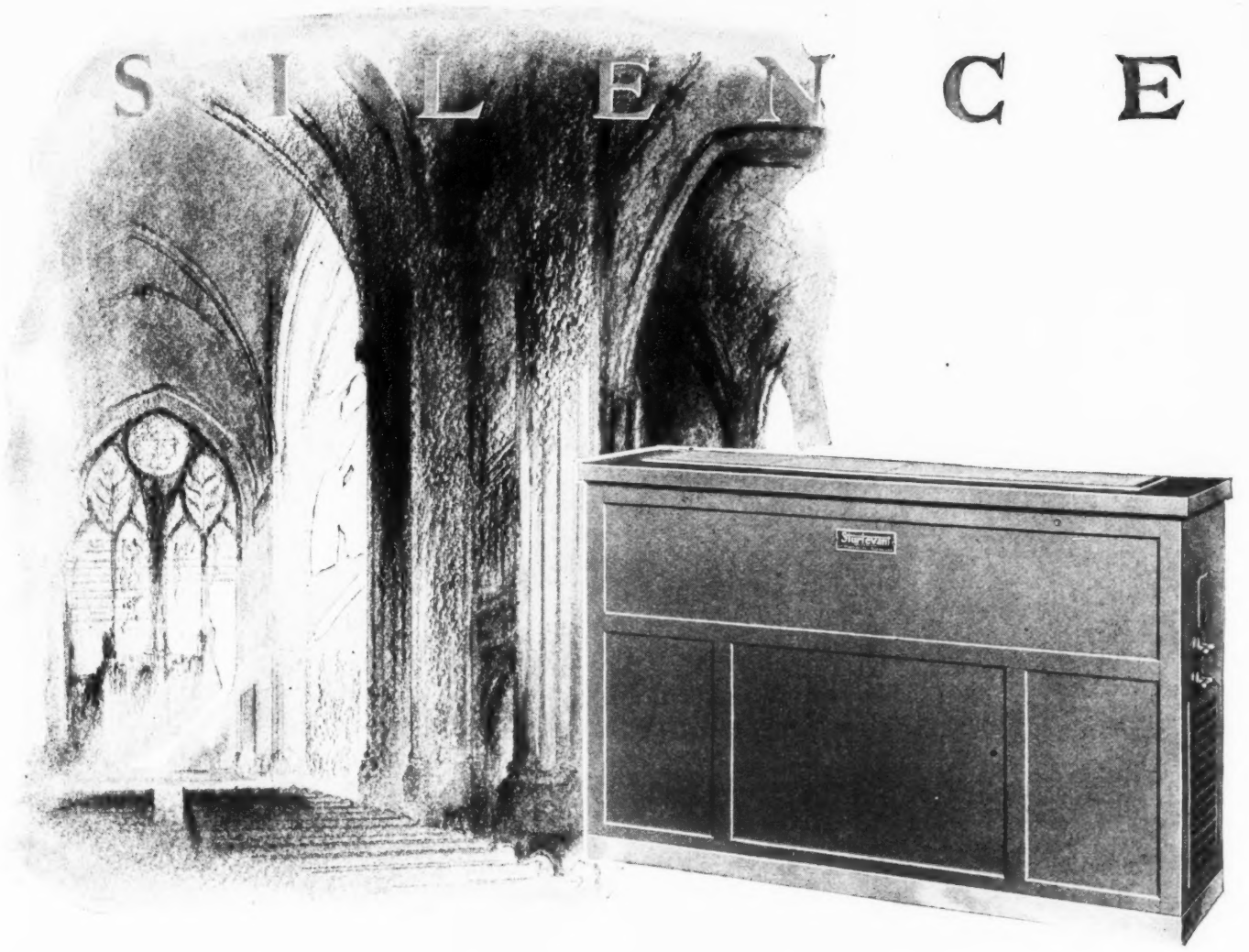
According to the ten factors used in the study the rural system of New Hanover county ranked first among the 100 counties with a general efficiency index of 85.4. The county has held this leading place each of the three years the systems have been measured. Currituck county remains in second place, Pamlico in third place, and Durham in fourth place. These four counties were the only ones in 1924-25 to be placed in efficiency group A by making a general index of 70 or more. The past year, 1925-26, four more counties came into the group, namely, Vance, Granville, Craven, and Northampton. Vance county progressed from nineteenth place in 1923-24 to twelfth place in 1924-25, and fifth place in 1925-26. Only six counties had a general index lower in 1925-26 than in 1924-25, namely, Washington, Person, Alexander, Randolph, Caldwell, and Brunswick, these indices being only slightly lower. The counties making the greatest change to a better rank from 1924-25 to 1925-26 were the following: Transylvania from 32nd to 20th place; Anson from 46th to 34th place; Perquimans from 53rd to 40th place; Rutherford from 72nd to 49th place; Lee from 73rd to 54th place: Iredell from 70th to 58th place, and Watauga from 93rd to 78th place.

Eight counties, comprising Wake, Forsyth, Carteret, Moore, Person, Alexander, Randolph, and Caldwell took a much lower rank, and ten counties comprising New Hanover, Currituck, Pamlico, Durham, Mecklenburg, Scotland, Macon, Surry, Yadkin, and Cherokee made no change in standing among the counties. The rural systems, except six, made an actual increase in the general index, some even changing from a lower to a higher group.

Greensboro still retains the lead among the city systems, with an index of 94.6. Salisbury led the city systems in group II for the second successive year, and Hickory made the second highest index for the cities in group III. The changes among the relative standing of city systems are not as great as among rural systems. Out of the 34 city systems, twelve retained the standing they had in 1924-25. (Concluded on Page 146)



PLOT PLAN,
COLUMBIA HIGH SCHOOL, SCHOOL DISTRICT OF SOUTH ORANGE AND MAPLEWOOD, N. J.
Guilbert & Betelle, Architects, Newark, N. J.



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an exclusive Sturtevant attainment

STAND close to the new Sturtevant Unit Ventilator as it draws fresh, invigorating air into the room. Hold your hand near the outlet . . . you can feel the air. But, however much you strain your ears, you will not hear the fan or motor at work.

The "Silent" Sturtevant makes no sound to disturb the quiet of schoolroom, church or office.

Silence is attained in the new Sturtevant Unit Ventilator by making the fan wheels fifty per cent larger in diameter than those used in other unit ventilators of the same rating. Consequently, the fan can be run very slowly, and the air moves noiselessly at a low velocity. An added advantage gained through the use of the slow speed fan is a saving in electric power.

Insure silence in your unit ventilation by specifying the "Silent" Sturtevant. Our nearest office will gladly send you a copy of Bulletin No. 344-A which gives complete information about this exclusive Sturtevant feature.

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FIREPROOF
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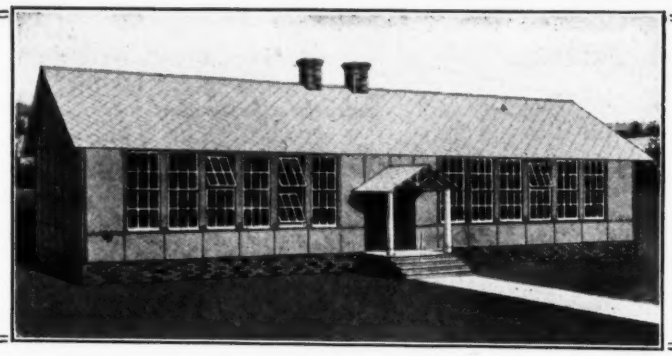

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(Concluded from Page 144)

HIGH SCHOOL LEADS IN COLLEGE TRAINING

—Nearly half the graduates of accredited high schools in the southern states enter college, according to a recent report of the U. S. Bureau of Education. The percentage varies from 39.1 in Louisiana to more than 66.6 per cent in South Carolina. More girls than boys attend high school, but the boys who go to college outnumber the girls. The average for the schools accredited by the Association of Colleges and Secondary Schools of the southern states is 48.2 per cent.

Slightly fewer than one sixth of the high-school pupils carry five or more studies. It does not hurt them to do so; perhaps they are the best students anyway, for five sixths of them were in the top quarter of their respective classes. Only about one in forty of those who took more than the usual four studies failed in any one of their courses.

HIGH-SCHOOL ADMINISTRATION

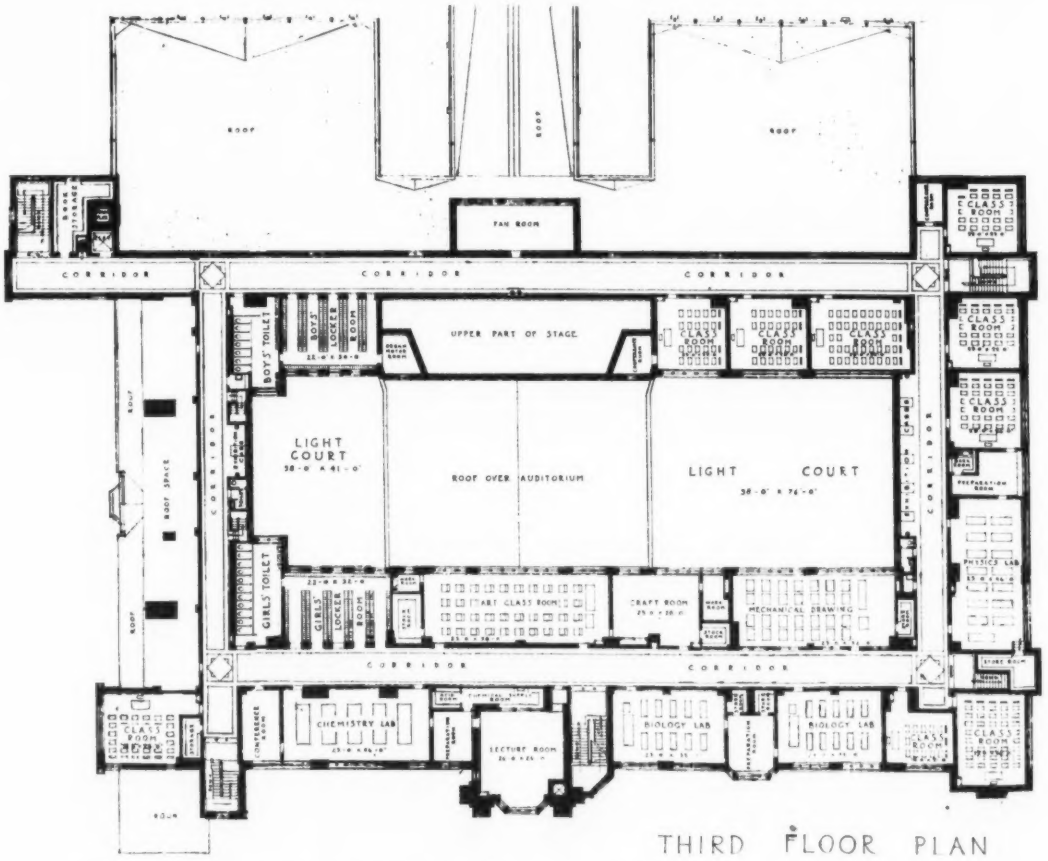
—Supervised research for high-school students is a distinctive feature of a new plan of education inaugurated in high-school classes of Highland Park, Mich. The bureau of education in a statement issued on December 1, points out that less recitation and more study, and less homework and more supervised research, are features of the new plan of education inaugurated last fall in the high-school classes of Highland Park.

Under the plan, the courses are divided into four sections. The inventory test or diagnosis, to discover the capacity and previous knowledge of the student; the preview, in which the student is given a general idea of the course of study; the assimilative period, in which the student engages in outside reading and research covering the period of the course; and the period of organization and recitation, during which the student in short talks or written theses, discusses the material studied during the assimilative period.

—Redding, Calif. One hundred and forty-seven girl students in the Shasta Union High School have voted in favor of wearing a uniform dress in the schoolroom. Students who object to the idea are not forced to wear a uniform.

—Pomona, Calif. A merit system has been placed in operation at the Kauffman Junior High School. Under the system, each pupil starts the semester with a clear record of 110, 100, or 90 merits. Perfect attendance entitles the student to five additional credits. If at the end of the semester a pupil has 95 or more merits, he starts the next semester with 110. If a student falls below 50 merits for a semester, he starts the following semester with 90 merits.

—Florence, Colo. With the opening of the second semester last winter, supervised study was introduced in the high school for the first time. This year the plan has been continued with marked success. The study has been extended from 45 to 75 minutes and practically all of the study work of the pupils is carried on in the classroom under direct supervision. Under the system, recitation work is reduced to the minimum, and lesson outlines are prepared, mimeographed, and distributed to the pupils as necessity may require.



COLUMBIA HIGH SCHOOL, SCHOOL DISTRICT OF SOUTH ORANGE AND MAPLEWOOD, N. J.
Guilbert & Betelle, Architects, Newark, N. J.

The School Problem of Ash Removal

—*and how it can be solved*

FROM the cumulative experience acquired in 1,609 school installations of G&G Ash Removal Equipment, Gillis & Geoghegan have made a thorough analysis of the school problems of ash removal.

To aid school officials and architects, the four principal classifications of school ash removal problems are given below, together with a recommendation for the proper type of G&G Telescopic Hoist Equipment that solves each problem and provides the school with speedy, labor-saving, economical ash removal.

Full advantage should be taken of the safety features and labor-saving devices of G&G Hoists, by specifying complete G&G Equipment. This includes Operator's Ladder, Hoisting Cans, Sidewalk Doors with Spring Guard Gates, Automatic Sidewalk Door Opening-Closing-Locking Device, Warning Gong, and Ash Can Truck.

Where a special problem is presented, which involves an unusual combination of conditions, Gillis & Geoghegan will be glad to help in the selection of the proper type of G&G Hoist.

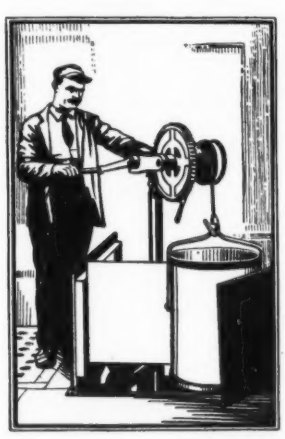
PROBLEM No. 1

Small volume of ashes. (About 6 cans daily.)
Short distance of lift. (About 10 feet.)
Hoistway opening against side of building.

SOLUTION

SPECIFY a Model A G&G Telescopic Hoist operated by hand power. Hoisting head revolves on ball bearings and can is deposited on pavement clear of hoistway without tilting or spilling of ashes. Empty cans are lowered by gravity under control of powerful band brake with brake lining. One man can easily perform the entire operation of ash removal. Operator exerts a pressure of only 12¼ lbs. in raising an average filled can weighing 175 lbs. at speed of 30 feet a minute.

Model A



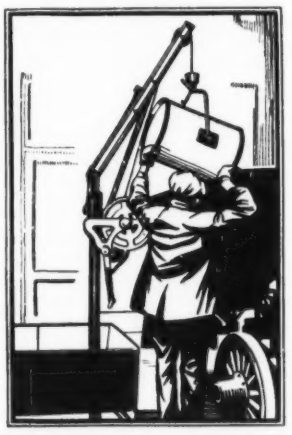
PROBLEM No. 2

Small volume of ashes. (About 6 cans daily.)
Short distance of lift. (About 10 feet.)
Hoistway opening near curb or in driveway.

SOLUTION

SPECIFY a Model B G&G Telescopic Hoist with Overhead Crane, operated by hand power. Ashes are dumped directly into wagon without rehandling cans at grade level. One man can easily perform the entire operation of ash removal. The Hoist occupies little space and, when not in use, no part shows above grade. Filled cans are raised at a speed of 30 ft. a minute and hoisting pressure of only 12¼ lbs. is required for the average can weighing 175 lbs.

Model B



PROBLEM No. 3

Large volume of ashes. (More than 15 cans daily.)
Deep hoisting area. (15 feet or more.)
Hoistway opening against side of building.

SOLUTION

SPECIFY a Model E G&G Telescopic Hoist electrically operated. This Hoist is built for heavy continuous duty and tests have proven it to be astonishingly economical in current consumption. While a large volume of ashes might make it desirable to employ more than one man, Hoist can be practically operated by one man and is therefore a labor saver. Loads up to 500 lbs. are raised at a speed of ***60 ft. a minute*** and are lowered by gravity.

Model E

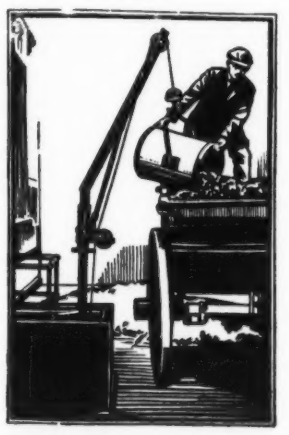
PROBLEM No. 4

Large volume of ashes. (More than 15 cans daily.)
Deep hoisting area. (15 feet or more.)
Hoistway opening near curb or in driveway.

SOLUTION

SPECIFY a Model D G&G Telescopic Hoist electrically operated. This Hoist has the Overhead Crane feature which makes it possible to dump ashes directly into wagon without rehandling at grade. The motor is mounted near base of Hoist and two men can easily handle a large quantity of ashes. Loads up to 300 lbs. are raised at a speed of 60 ft. a minute. Surprisingly little current is used in the operation of this Hoist.

Model D



G&G Ash Removal Equipment Serves Schools in 43 States

The following States have more than 50 installations

Connecticut.....58 Schools	Kansas .....54 Schools	New Jersey .....130 Schools
District of Columbia.....23 Schools	Massachusetts .....93 Schools	New York .....365 Schools
Illinois .....58 Schools	Michigan .....99 Schools	Ohio .....163 Schools
Iowa .....68 Schools	Minnesota .....54 Schools	Pennsylvania .....141 Schools

And G&G Hoists are now Standard Equipment with Boards of Education in

Duluth, Minn.	Cleveland, O.	Jersey City, N. J.
Kansas City, Mo.	Baltimore, Md.	Boston, Mass.
Kansas City, Kans.	Washington, D. C.	New York, N. Y.

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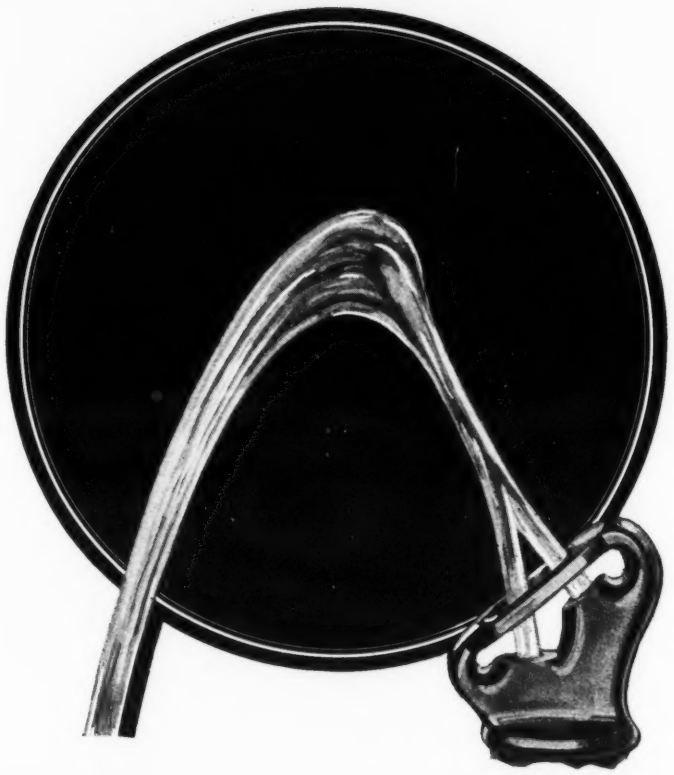
DRINKING FOUNTAINS



SCHOOL HYGIENE

A SURVEY OF ENDEMIC GOITER IN OREGON

Dr. Robert Olesen, of the U. S. Public Health Service, in a recent issue of "Public Health Reports," gives a report on a recent study of endemic goiter in the State of Oregon. The results show that the goiterous condition is more frequently encountered in the Pacific Northwest than in any other section of the country. Of more than two million men examined for military service in Oregon, there was a ratio of 26.31 for each 1,000 examinations, which gave the state the next to the highest rank in the amount of simple goiter.

It is brought out that in Portland there is a rather high incidence of endemic goiter. Dr. Helen A. Cary, medical director in the Portland schools, found that thyroid enlargement varies in the different schools, being less in groups which have received doses of iodine. It was found that goiter prevailed among boys to the extent of 30 per cent, and among the girls to 60 per cent. Dr. Else, in a survey in Portland, found an incidence of 27 per cent among 407 boys, and 56.2 per cent among 2,279 girls.

Attention is called to the danger of mistaking certain muscles or folds of tissue for enlargement of the thyroid gland. Such mistakes are not confined to lay people but are also made by physicians and nurses. The remedy lies in a better understanding of the topography of the gland, as well as in more extended training in the methods of examining the gland in its normal and abnormal states.

In the present study, thyroid examinations were made in 32 of the largest cities and towns of Oregon. In all, 8,181 boys and 9,427 girls attending the public and parochial schools were examined. Although the survey was made in the largest cities and towns in the state, the findings are not indicative of urban conditions alone, but are representative of both urban and rural sections.

Of the 8,181 boys examined, there were 1,826 thyroid enlargements of all degrees, or 22.3 per cent. The percentage incidence among the girls was higher, with 3,617 enlargements, or 38.3 per cent among 9,427 girls.

Of the very slight thyroid enlargements, there were 18 per cent among the boys and 23.5 per cent among the girls. Slight enlargements prevailed to the extent of 2.4 per cent among the boys and 9.7 per cent among the girls. Moderate enlargements predominated among the girls, 1.0 per cent being recorded, as against 0.086 per cent for the boys. No marked enlargements were found among the boys and only 3 were noted among the girls.

Adenomatous goiters are especially interesting to the public health administrator, because of their potentialities for toxicity and malignancy in adulthood. Among the boys examined in Oregon, adenomatous goiters prevailed to the extent of 1.8 per cent, while among the girls the incidence was higher, 4.1 per cent.

The report shows that the highest prevalence rates were recorded among the boys attending schools in Hood River, Forest Grove, Cottage Grove, and Newberg, the percentages being 33.6, 33.3, 31.3, and 29.9 respectively. Among the girls, endemic thyroid enlargement was more frequent in Oregon City, Cottage Grove, Salem, Hood River, Grants Pass, and Forest Grove, in the order named. In the majority of the places, the incidence rates of both sexes combined ranged between 30 and 40 per cent.

The lowest incidence rates were recorded among the boys living in North Bend, Marshfield, Eugene, and Ontario. The lowest rates among the girls were found in Ontario, North Bend, Marshfield, and Eugene, in the order named, the percentages being 12.7, 21.9, 27.6, and 30.6, respectively. Seaside on the coast, has a low goiter rate of 3.1 per cent.

In a study of the age incidence of goiter in Oregon, it is noted that there is a gradual increase in the incidence of goiter among boys from the age of 10 years until the peak is reached at 13 years. Thereafter, there is a steady decline in the incidence of the disease as the higher ages are reached. Among the girls, however, there is a steady increase in incidence from the age of 10 to 18 years.

There appears to be no relationship between the amount of goiter in a given community in Oregon and the treatment of the public water supplies by filtration and chlorination. Bull Run water, with which Portland is supplied, has been shown to have 0.03 and 0.10 parts of iodine per billion parts. A sample of water from the Clackamas river showed 0.06 parts of iodine per billion parts, but the greatest amount of endemic goiter among girls was found in Oregon City, which uses the untreated water from the river. A sample of water from Marshfield failed to show the presence of iodine. In Oregon a deficiency of iodine in both water and food is no doubt responsible in a large degree for the incidence of goiter.

SEASONAL VARIATION IN GROWTH OF SCHOOL CHILDREN

Dr. Haven Emerson, of New York City, in a recent issue of the *American Medical Association Journal*, writes extensively on the subject of Seasonal Variation in the Growth of School Children, basing his conclusions on a study of the records of 833 children in Honolulu, New York, and Toronto.

The study was undertaken with the hope of determining whether variations in the gains in weight of children of school age throughout the year followed some biologic law, or whether they resulted from accidental and controllable factors.

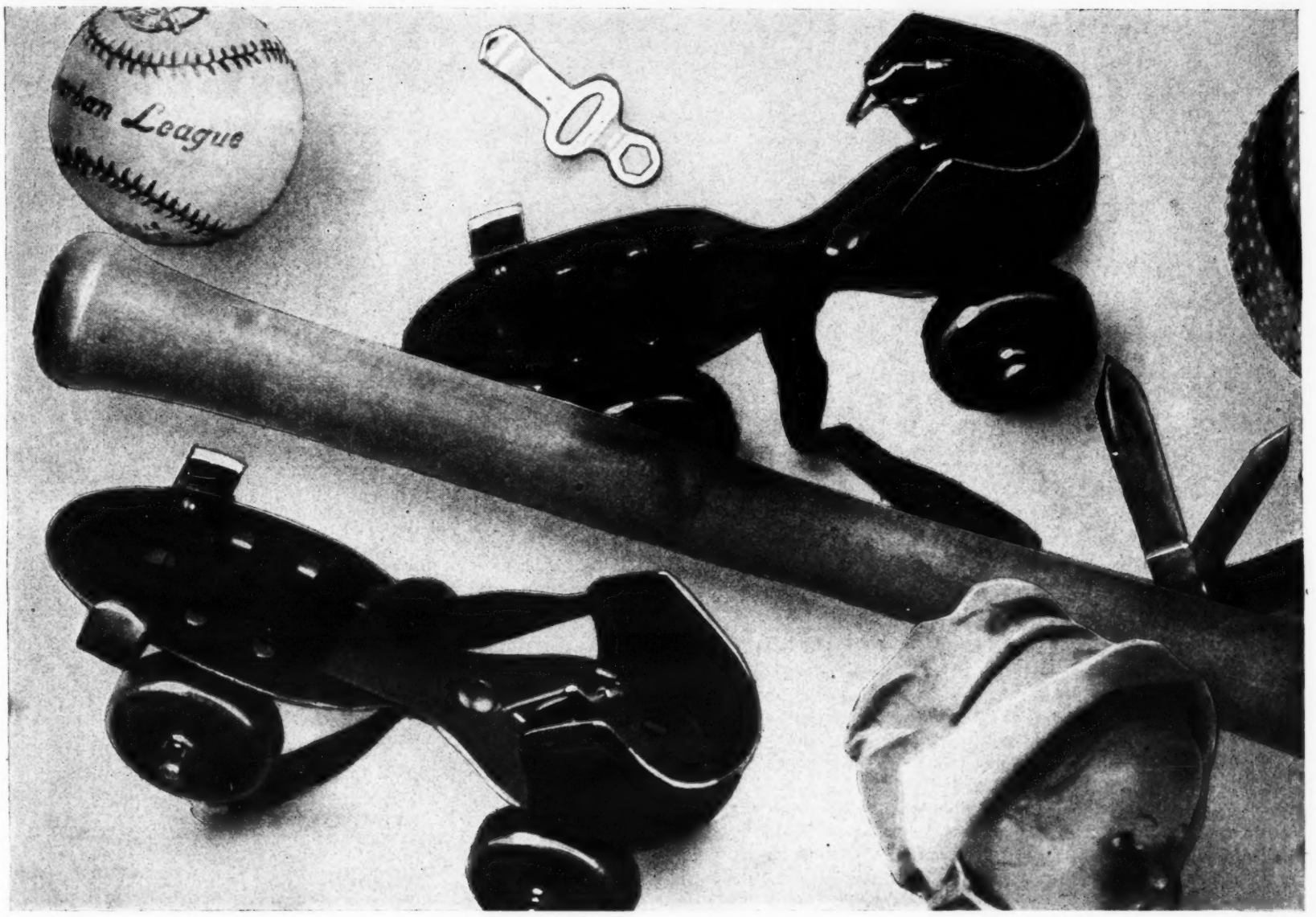
It was brought out that little, if any, doubt could be cast on the observations relative to growth of children in the cities of the northeastern part of the United States. During infancy, and up to the age of 2 years, healthy children gain each month at a gradually decreasing percental rate. Unsuitable diet and infections of any kind are known to decrease temporarily the rate of gain, or determine an actual loss of weight in infants.

Among children of school age (5 to 16 years of age) in northern cities of the United States, gains in weight from month to month were commonly found to be at a lower rate in the months from January to May than in the months from July to November, and it was common to find children in apparent health holding the same weight for several months in succession.

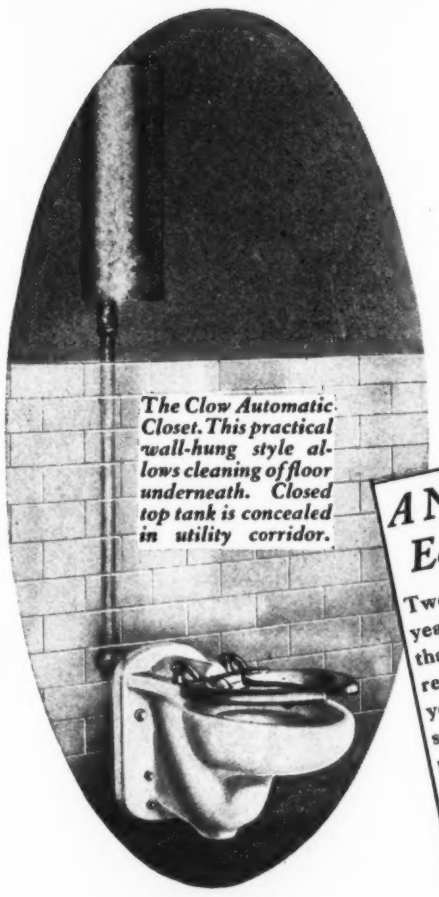
Gain in body height or length at all ages of infancy and childhood shows little or no seasonal variations, even though the weight of the child may be arrested for several months at a time, or weight be actually lost during the progressive increase in height.

(Continued on Page 151)

What Do Little Boys and Girls Think Of?



Jumping ropes, skates, balls, dolls, games—or water closets?



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Children—to whom a lost ball is a tragedy—a new doll the utmost joy—have few thoughts for such dull things as water closets.

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Centrifugal Vacuum Pump Merger

EFFECTIVE JANUARY 1, 1928, the business formerly known as the Young Pump Company becomes an integral part of the C. A. Dunham Company, and the Young Centrifugal Vacuum Pump is henceforth a consolidated unit with the Dunham Vacuum Pump, the latter being a laboratory development of many years' effort.

The Dunham Vacuum Pump (exhibited at the recent Power Show in New York), under which name the combined unit will be known, contains the principle and general form of the Young Pump together with all its many advantages well known to users. Added to this, from the Dunham Research, is the large displacement capacity, a marked increase in water capacity, and the ability to draw an unusually high vacuum simultaneously with the discharge to the boiler, in keeping with the needs of improved heating practice.

Nineteen Hundred and Twenty-eight marks the twenty-fifth anniversary of the C. A. Dunham Company. At one end of this quarter century span will be found the invention which revolutionized heating in 1903—the Dunham Thermostatic Radiator Trap. At the other end, the equally revolutionary Dunham Differential Vacuum Heating System which, through the use of Sub-Atmospheric Steam, solves the Nation's problem of Overheating.

The manufacturing plant at Michigan City, Indiana, where Dunham Pumps are now made, will be greatly increased in capacity during 1928. This will give the Dunham Company three large and thoroughly modern plants, one in Marshalltown, Iowa, one in Michigan City, Indiana, and one in Toronto, Canada.

Through these changes, and by reason of this important consolidation, it now becomes possible to still further extend the scope of service rendered to the Nation's heating, by that most remarkable achievement of the decade—means for successfully circulating steam at sub-atmospheric temperatures and at widely varying pressures.

We feel that this, our twenty-fifth anniversary year, will mark the beginning of even a greater period of fulfillment than has the quarter century now brought to a close, and to this end we pledge all the efforts and resources of a well trained organization whose lives and interests are a part of this enterprise.

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The DUNHAM Difr-enshal-Vacm Heating System. (A FIXED DIFFERENTIAL IN PRESSURE — A VARIABLE DEGREE OF VACUUM)

U. S. Patent No. 1644114. Additional patents in the United States, Canada, and Foreign Countries now pending.

Over seventy branch and local sales offices in the United States, Canada and the United Kingdom bring Dunham Heating Service as close to you as your telephone. Consult your telephone directory for the address of our office in your city. An engineer will counsel with you on any project.

ROSS Steel BOILERS

Commonly acknowledged the supremely efficient and economical heating plant for school houses because of quick response to heating needs.

A SOLID UNIT OF ELECTRICALLY WELDED OPEN HEARTH STEEL, MADE TO OUTLAST YOUR BUILDING.

THE health of teachers and scholars and the whole morale of the school depend on your heating plant. You will render your community and the children under your care a vital service by insisting on the proper heating plant for your new or renovated building.

The Ross Steel Boiler with the smokeless firebox, long combustion chamber, exceptional Crown Sheet area, plus extended hot gas travel and rapid circulation extracts the utmost of heat units from any fuel. The patented Convex full length, self-cleaning Crown Sheet banishes the usual accumulation of silt over the hottest part of the furnace and the consequent loss of heat.

The Ross Steel Boiler is especially adapted for burning oil and the cheaper grades of coal.

Write for Catalog and inform yourself on the advantages of this boiler.

The Frost Manufacturing Co. SINCE 1851

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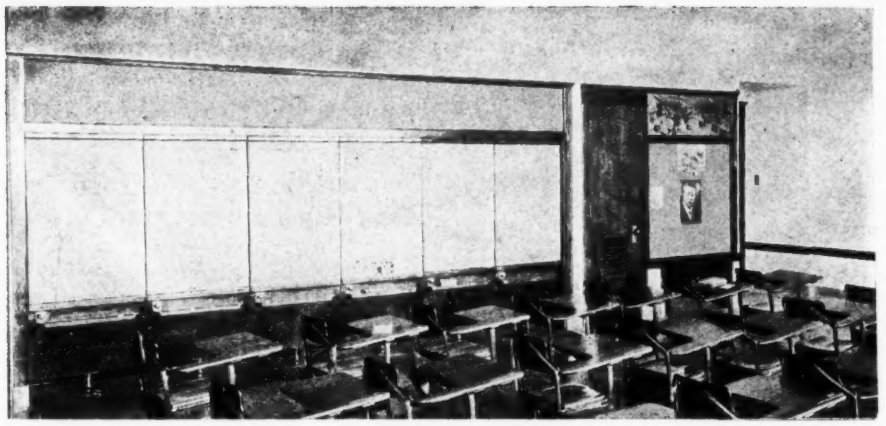
Sturdily Built to Give Years of Satisfactory Service, Miller School Wardrobes Will "Outlast the Building"

NOT until you see a Miller Wardrobe after years of service can you appreciate the high quality of materials used in its construction and the great care that is taken to make every detail exactly right. Miller Wardrobes are strong, well-built, sturdy, handsome. As long as your school building stands, Miller Wardrobes will be on duty, serviceable and efficient.

Sixteen outstanding advantages of Miller Wardrobes have led to their selection as standard equipment in hundreds of leading schools all over the nation:

1. **More building for less money** than where cloak rooms are used. Reduction in space required for wardrobes will more than pay for the wardrobes themselves.
2. **Reduction in heating expense.** Where cloak rooms are used, there is more cubical contents in the building to heat. Owing to the fact that the wardrobe doors are always kept closed, due to their ease of operation, nothing but the foul or cold air can be drawn off underneath the bottom of the doors. It is obvious then that if there is no waste of the heated air, there will be a saving in the amount of fuel which is to be used. **The Miller Wardrobe is the only wardrobe which solves this problem.**
3. **Perfect ventilation** of the schoolroom or corridor, and sanitary conditions in the handling of wraps.
4. **Maximum discipline** in assembling and dismissing classes in the shortest possible time.
5. **No waste of wall space** caused by mullions or open doors owing to the fact that the genuine Bangor slate blackboard is continuous across the front of the wardrobe (where desired).
6. **A mechanism that cannot get out of order with ordinary use,** and one that is **noiseless** in its operation.



This photograph shows the Standard Type Miller Wardrobe, closed. The doors are faced with genuine Bangor Slate blackboard, in six panels across the front. Rabbeting of doors prevents chalk dust from entering the wardrobe; and a simple adjustment on the operating mechanism and door hardware keeps the doors and blackboard panels always in perfect condition.

We publish a 48-page, illustrated booklet, showing Miller School Wardrobes open and closed, in actual use in all types of schools and schoolrooms. Write for your copy. Ask for Catalog W-6. See address below.

7. **Provision to get into each wardrobe individually** without disturbing pupils working at the various doors in the Standard Type Wardrobe.
8. **All doors open or close in one operation** as easily as the door leading to the classroom is opened or closed.
9. **Absolute freedom from dampness, odors, etc.,** circulating back into the classroom, as the ventilating system is, as a rule, connected with the wardrobe.
10. **Security from petty pilfering.** Wardrobes under the teacher's eye all the time, or under one lock and key, make it difficult for anyone to get into them without being observed.
11. **Additional storage space,** pigeon holes or cabinets may be built in the wardrobe recess.
12. **No possibility of injuries** in the operation of the wardrobes owing to automatic bolts and the fool-proof construction.
13. **Rabbeting of doors prevents chalk dust from entering** the wardrobes.
14. **Perfect alignment of doors, slate, etc.,** and uninterrupted operation of same, made possible by a simple adjustment on the operating mechanism and door hardware.
15. **Solid bronze hardware** only is furnished on either type of wardrobe.
16. **Greater hanging space for wraps** than offered in any other type of wardrobe, because hooks may be placed on the back of all doors.

Write for a copy of our booklet. Let us tell you the nearest installation; so that you may see Miller Wardrobes in actual operation, and talk with the teachers and school officials who use them.

K-M SUPPLY CO. 123 West Eighth St. Kansas City, Mo.

(Continued from Page 148)

Among the factors which are thought to have a part in causing a variation from the regularity of growth, regardless of the months, are the following:

a) Climatic changes, such as those of temperature, humidity and air movement, and of sunlight, both in quantity and quality.

b) Dietetic changes, such as differences in the amount and quality of foods, particularly in those factors known to determine growth.

c) Prevalence of sickness, especially acute infections.

d) Social and religious customs and observances, such as periods of entertainment, fasting, feasting, and holidays.

e) Educational obligations, such as the period of obligatory school attendance, preparation for examinations, or vacation periods.

f) Possible variation in the functional activity of the endocrine glands, separately or together, according to the months of the year.

With the cooperation of Dr. R. B. Faus, of the Royal School at Honolulu, T. H., Dr. F. D. Bell of the Provincial Health Department at Toronto, and Mr. John C. Gebhart of the Association for Improving the Condition of the Poor in New York, records were obtained of the height, weight, diet, and incidental sicknesses by months for a year for each of 833 school children between the ages of 5 and 10 years. The collection of the measurements was under the direct supervision of physicians, and of nurses acting under their control. The children studied represented many race stocks and comprised those from 5 to 10 years of age.

In 168 instances (20 per cent), the children gained weight every month in the year, or showed a stationary weight for not more than one month of the twelve, whereas 665 (80 per cent), showed either an arrest in weight for two or more months, or registered a loss of weight for one or more months in the year. There were only two or three of the New York children who showed any approximation to regular monthly gains. All the New York children were from poor tenement homes where the race stocks were almost wholly Italian or Jewish. The 40 children in Honolulu and Toronto with suitable diets and freedom from sicknesses appeared to exhibit normal growth curves, even though their number from among the total cases studied would suggest that such a condition is the exceptional rather than the average. It appears reasonable to assume that if any of the 833 children show a record of healthy growth, it should be those who have made continuous gains throughout the year. A study of the distribution of the gain of these 112 children in the first five months of the year (January to May), inclusive, shows that among the New York children the January-to-May gains represented only 55.5 per cent of the gains occurring in the months of July through November; that among the 33 Toronto children the January-to-May gains were 75.2 per cent of the July-to-November gains, and that among the Honolulu children the January-to-May gains were 123.4 per cent of the July-to-November gains.

Gains in weight of all the children in each of the three cities were regular throughout the twelve months of observation and it was deemed sufficient to record that no evidence was obtained showing any seasonal variation in the gain in weight of healthy children.

Explanation for the failure to gain was sought in the records of illnesses and in dietary changes. No significant changes from month to month or from season to season in the amount of food supplied or in the character of foods used, could be found which justified an opinion that in this factor lay the cause of loss of weight or failure to gain.

The incidence of disease appears decidedly significant, although records only of recognized infections have been made. In 209 cases one or more sickness incidents were reported in children who showed loss in weight or arrest in weight for two or more months. The month of onset of the sickness is used in each instance in listing the incidence. The months when arrest in weight or loss in weight took place were those in which sickness occurred or in the next succeeding month.

In 456 cases in which there was arrest in weight for two or more months, or loss in weight, and in which there was no record of sickness or other recognized cause of interference with gain in weight, the distribution of these occurrences is shown by months of the year and by city.

It should be noted that there are 6.6 times as many instances (160:24) of loss of weight or arrest of weight connected with reported illness in the five months from January to May as there are in the five months from July to November. This is consistent with Porter's observation that the monthly gains in weight among Boston school children in the first five months of the year average six times as much as the gains in the last five months of the year.

In order to test a possible relation between temperature, humidity, sunshine, and the monthly gains in weight of children in the three cities, records of the weather bureau were obtained for the months of the particular years involved for each city. In the chart the total hours of sunshine for each of the twelve months are given, together with the record of monthly gains in weight in each instance of a healthy child, who was reported free from dietetic errors or cases of illness during the same months. In spite of the differences in the seasonal distribution and amount of sunshine in the three cities, there is no apparent gross variation among the three groups of children. It is recognized that total hours of sunshine does not accurately represent the possible growth-promoting effectiveness of sunshine in cities of different latitudes for the various months of the year. Since there is no evidence of presumptive value that the growth in weight of children between 5 and 10 years of age is materially affected by seasonal variations in the amount of sunlight, it is deemed safe to ignore this factor in view of the evidence.

As a result of his study, Dr. Emerson comes to the following conclusions:

1. That variations in the rate of gain in weight of children from 5 to 10 years of age are commonly observed, the rate of gain being commonly greater during the months when school vacations and favorable climatic conditions permit the nearest approach to good hygienic conditions for children, and when the incidence of acute infections affecting children is at its lowest.

2. That there does not appear to be any evidence to justify considering the seasonal variations of gains in weight as a normal biologic phenomenon for healthy children under favorable conditions of environment.

3. Among the determining factors of the variations in the rate of gain in weight of children of school age in Honolulu, Toronto, and New York City, the incidence of infections, particularly those acquired through the respiratory tract, is believed to be of much importance.

4. Seasonal or periodic variation in weight accretion of children is probably an accidental phenomenon, but not necessary or euthenic in character, but an expression of unfavorable conditions affecting the child.

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For Durability

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pressure tank closet with vitreous china juvenile height (14 inches) syphon jet bowl with extended front lip. Patent Automatic seat operating valve, galvanized iron pressure tank with bracket shelf and brass flush pipe with holder and double rubber bumper. All exposed brass trimmings heavily nickel plated.

Endurance is an inherent characteristic of NONCO Plumbing Fixtures.

They are carefully designed and their sturdiness in construction covers years of continuous service.

Every NONCO Fixture reflects in every detail, beauty, utility, and durability, covering efficiency in economy and operation and absolute satisfaction in use.

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PIONEER MANUFACTURERS OF PLUMBING FIXTURES FOR SCHOOLS

5. A child who fails to gain in weight each month up to the age of 10 years, is in all probability suffering from some form of infection or fatigue in which diet, housing, and school attendance may play important contributing parts.

6. Groups of children living under favorable conditions, in the absence of infections or other sicknesses, will be found to exhibit a regular monthly gain in weight regardless of the season of the year.

HYGIENE AND SANITATION

"When a child's eyes are strained, headaches, upset stomach and nervous disorders frequently result. It may be defective eyesight that is causing the trouble. Ample, soft and glareless lights are best for the home and school. Most of our homes are atrociously lighted. Children often study at home on the dining-room table, which is often highly polished. The glare hurts their eyes," says Miss Helen W. Hardy of Eyesight Conservation Council of America. "Defective vision will handicap a child not only in school by making it hard for him to keep up with his studies, but it will also handicap him in his other work, and in his play. If his sight is poor he may not be able to see danger ahead of him, and thereby bring bodily harm upon himself."

—The schools of Boise, Idaho, were closed because of the prevalence of infantile paralysis, compelling 3,600 children to remain at home. The local newspapers published daily lessons for the quarantined pupils. The high school at Eugene, Oregon, was closed for some days. Reports are to the effect that cold weather has curbed the epidemic.

—Athens, Ga. During the last scholastic year, the school children made a dental score of one hundred per cent. A similar goal has been set for the school year 1927-28.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS WILL MEET IN NEW YORK CITY

The American Society of Heating and Ventilating Engineers will hold its 34th annual meeting January 23 to 26, at the Hotel Pennsylvania, New York City.

The members of the New York chapter of the society will be hosts at the meeting and an extensive program has been prepared.

The first morning of the convention will be given over to registration and meetings of the council and other committees. The technical features of the program will begin in the afternoon with President F. P. Anderson presiding. A number of technical papers will be read following the election of officers, and it is planned to have one or more committee reports.

At the convention one session will be devoted to a discussion of factory heating and ventilation. Another will take up various codes now pending before the society. The committee on research will report on the progress of the committee's work, and the White Sulphur Springs committee will present its report recommending a procedure for the coordination of facilities and data of reseach laboratory investigations and the use of a central agency for making the data available to those interested in the work. Seven well-known experts have been secured to give talks before the members and it is expected that this session will prove one of the most interesting of the convention.

AN OLD AND A NEW SCHOOLHOUSE

An interesting schoolhouse story is told at Boone, N. C. Forty-two years ago, Cove Creek township erected a schoolhouse, at a cost of $25. Recently another schoolhouse was completed in the same township, at a cost of $15,000, which is a unit of a $40,000 consolidated school.

Superintendent Smith Hagaman opened an old chest recently which contained the school records. Here was an order dated July 4, 1885, for the payment of $25 for a schoolhouse and another of $7.82 for equipment.

These old documents raised the question, "What kind of schoolhouses were these, which could be built for $25 and furnished for $7.82?"

"They were the simplest kind of log huts," Mr. Hagaman explained. "Four walls and a roof, sometimes with only dirt floors. They were built when logs in the mountains could be had for cutting down the trees. None of them is left standing now, except one, down on the south side of the Blue Ridge, and it has been so transformed that it would never be recognized as a log hut. We covered the logs on the outside with weather boarding and the inside with wall boards and made a very comfortable schoolhouse of it."

The ancient teachers' vouchers in the old chest revealed another point about the cost of education in those days, and also about the educational qualifications of the school boards themselves. One voucher ordered Ellen Ford to be paid $15 for one month's teaching.

Queer customs prevailed in these early schools. One schoolmaster made it a rule that the pupil who arrived at school first would recite first. This created such keen competition that sometimes a pupil would arrive at the schoolhouse before daybreak, build a fire, and wait until the arrival of the teacher in order to be allowed to recite first.

Another story is told of a certain schoolmaster who flourished in this county in the seventies. On the last day of school, according to the story told by a prominent citizen of the Cove Creek section, this schoolmaster lined the boys up in front of the school and gave each a drink of corn liquor from a dipper.

Yes, schools have changed in more ways than one in the appearances of the buildings since the seventies and eighties.

BUYERS' NEWS

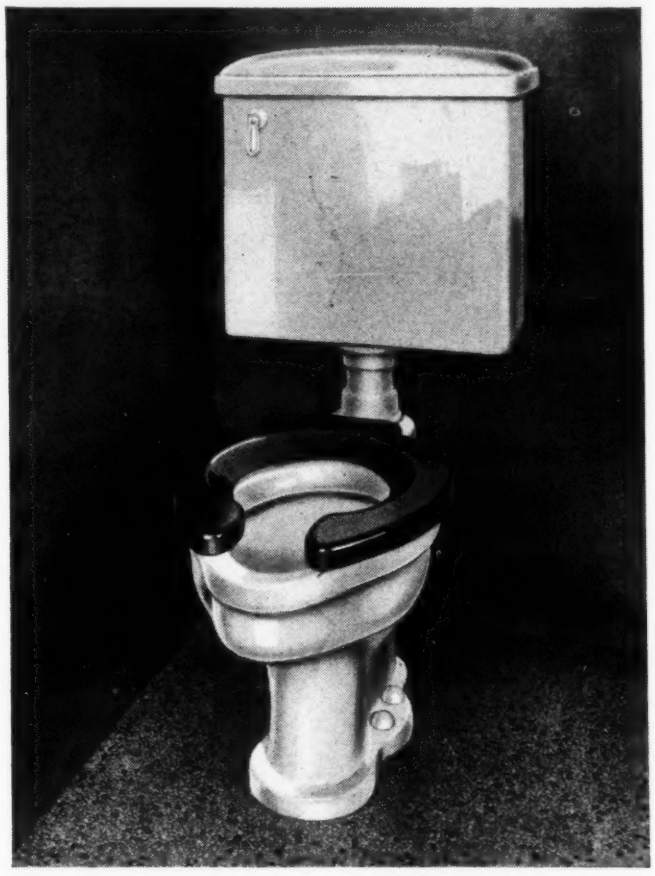
Mr. Mills of Longmans, Green & Company Dies

Mr. Charles J. Mills, head of the American firm of Longmans, Green & Company, died on November 9 at his New York home, at the age of 81.

Mr. Mills became connected with the firm in 1875 and at the time of his death had completed sixty years of service in the firm. In the development of a strictly American list of textbook authors, Mr. Mills enlisted Theodore Roosevelt and Henry Cabot Lodge, who prepared volumes on New York and Boston for the series entitled "Historic Towns." Another future president was added to the list when Woodrow Wilson wrote his volume on "Division and Reunion" for the Epochs of American History Series. Another series entitled "American Citizen Series" was edited by Albert Bushnell Hart.

Under the direction of Mr. Mills, the American house, like its English parent, made educational books a strong feature, and the Alexander and Dewey arithmetics, the Alexander spelling books, the Horace Mann readers, and the Woodburn and Moran histories are well known in every state.

Mr. Mills built up a fine reputation for sound list building, scholarly conceptions of publishing, and successful business organization. The books of the American house have become worthy of the lists of the famous English house from which it sprang and with which it is associated.



THIS TOILET SEAT WILL NEVER WEAR OUT—

it will never require repairs

IN GUARANTEEING the Church Sani-Black Seat for the lifetime of any building in which it is installed, we guarantee it, in effect, forever. Its first cost is its last cost.

Yet the original cost of a Church Sani-Black Seat is no higher than that of many other seats. And they will never become worn, unsightly, and unsanitary. . . . In large installations, the expense of repairing or replacing toilet seats can amount to a considerable sum. Especially in such buildings as hotels, hospitals, and office buildings, where the most constant usage is to be expected. . . . When *maintenance costs* are considered, the real economy of Church Sani-Black Seats becomes apparent.

The core of the Sani-Black Seat is formed by cross-grained layers of wood and rubber, vulcanized into a compact, solidly welded unit that will never warp nor crack. The outside covering is composed of a hard composition, vulcanized to the core. It completely seals the core. It has no joints — no breaks of any kind in its lustrous, jet-black surface. It cannot scratch, chip nor wear off.

This same hard composition covers the hinges on the all-black seats. They are completely sanitary. They cannot tarnish, rust nor become corroded. And they are permanently held in place by screws, which are tapped through solid steel bars—molded *into* the seat core.

Fill out the coupon below! It will bring you our illustrated, 100-page architects' catalog, describing our full line of Sani-Black and Sani-White Seats. C. F. Church Manufacturing Co., Holyoke, Mass.

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LOOK FOR THIS NAME ON UNDER-SIDE OF SEAT

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Health. Another mighty important thing to think about. SANYMETAL partitions are all that their name implies—sanitary and easily kept that way. Attractive and economical too. Unit sections for any space.

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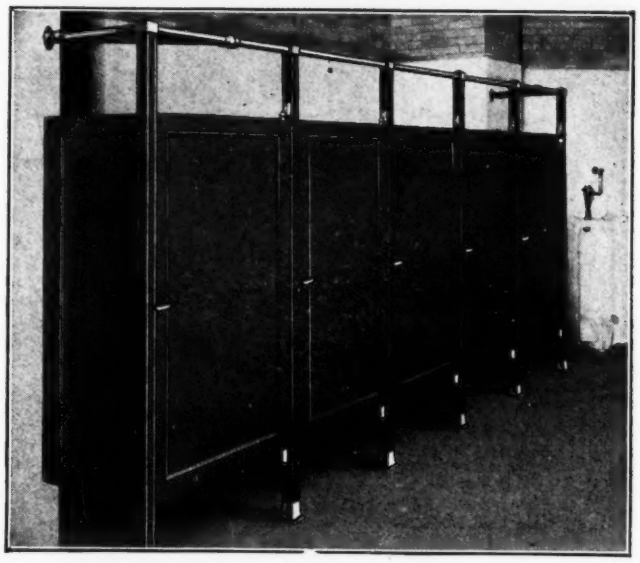

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CHICAGO CORRESPONDENCE

Every Chicago principal and teacher "whose name appears on the payrolls" (almost 13,000) has been asked to accept membership in the school-board vigilant society. This organization is being sponsored by the new bureau of safety. The purpose of the society is set forth in a bulletin from the superintendent's office—"to keep a constant watch for and to report by special notification any and all violations on the part of motorists who drive cars and trucks on the streets of the city of Chicago, which come to their notice."

Almost simultaneously, the Chicago schools safety league was launched for mothers and fathers of school children. Every public-school pupil, from kindergarten through senior high school, took home an application blank to be signed by the parents. This is called a "drive for the safety of children."

Up to and including December 12, there have been 929 persons killed by autos and trucks in Cook county this year.

Under date of November 22, 1927, Mayor William Hale Thompson sent a letter to the board of education regarding "neglected and ignored heroes." This letter was mimeographed and sent to the principals with the request that "all principals and history teachers in the Chicago public schools be directed to give special oral instruction on the lives and achievements of neglected and ignored heroes."

The McAndrew trial will not be ended until in January. The case has been going slowly forward with considerable discussion regarding allegedly unpatriotic history texts. There have been three developments of interest during the past month.

(1) The Chicago *Tribune* blazoned across its front page, "McAndrew Quits His Trial," and then proceeded to say, "Amid the cheers and jeers of a gallery jammed with excited followers of either side, the trial of Supt. William McAndrew yesterday afternoon (Nov. 23) reached a climax when Mr. McAndrew literally walked out of the board-of-education rooms during the hearing and precipitated a noisy clash between opposing factions."

The suspended superintendent later addressed a letter to the members of the school board explaining his action as follows:

"It is now nearly three months since your president and five members voted to charge me with insubordination and improper conduct in having entered into an unlawful confederacy with certain employees of the board, designated as extra teachers.

"These teachers were doing the work assigned them under an order of the board recommended years ago by former Supt. Mrs. Ella Flagg Young. I believed that these teachers were essential agencies for the efficient conduct of the schools and I did not assist the attorney of the board to carry out the design of a majority of the board to supplant them by political appointees.

"It is now seven months since the new mayor in his official inaugural address declared his intention, though he has no proper jurisdiction over the schools, to proceed to oust the superintendent.

"I have, week after week, presented myself for a trial upon the above charges, which has been denied me. Instead, you have entertained various paid patriots, who have complained of the nature of the various textbooks in use in the schools of America adopted for Chicago by the board of education before I became superintendent, readopted by the board on recommendation of your own teachers after I became superintendent, books examined by your own president and reported by him as unobjectionable, books referred to a committee of your board which failed to report them as objectionable.

"Instead of trying me on the alleged misdemeanor for which I was suspended, you have permitted to be added a host of irrelevant allegations. Of these sixteen charges, No. 3, concerning the 'English-speaking union' and alleging its misdemeanors, refers to an organization of which I am not and never was a member, and with which I never had any dealings here or elsewhere.

"Charge No. 5 is against the University of Chicago, with which I have no connection and whose courses had been taken by your teachers long before my connection with your system.

"Charge No. 12, an allegation of obligation to publishers of textbooks because I edited the Educational Review, aims to inject impropriety into a service given by schoolmen generally and in this case never involving textbooks at all.

"Charges 1 and 2 concern history textbooks; charge 4, opposition to use of the schools for making collections of money from children; charge 6, nomination of some examiner in place of Examiner Campbell; charge 7, opposing the dismissal of children in school hours to make way for teachers' meetings; charge 8, failure to favor Mr. Coath's attacks on one teacher's textbook while over a hundred others were retained by the board; charge 9, failure to indorse the views of a minority of the board regarding the transfer of a teacher; charges 10 and 11, serving teachers' institutes outside of Chicago, which is expected of superintendents generally and was authorized by your three preceding presidents; charge 13, testing the work of the schools; charge 14, failure of ideas advocated by some members of the board of education; charge 15, recommending the improper appointment of school employees, and charge 16, delay in the execution of the board of education's orders.

"All these are instances of acts of the board of education itself as organized before the election of the present president. Their decisions contrary to his desires are, now that he is able to command a majority of one vote, cited as misdemeanors of a superintendent of schools, as if the superintendent 'by insolence and contempt toward the board and the entire proceedings,' as the charges say, had been able to deprive the board members of their exercise of judgment and their ability to reach a decision.

"The repeated published assertion of your president that he will put the superintendent out; the degradation of your school system in the eyes of the entire country by editorial condemnation of this trial as a farce and vaudeville; the cloud of aspersion you permit to remain upon your best teachers that they recommended to the superintendent the adoption of poisoned books; the effect on your school children of the continued newspaper characterization of your proceedings as a travesty on justice; the repeated and uncontradicted editorial designation of this trial as before a packed jury and an admittedly prejudiced judge, all lead me to desire to escape being a party to the continuance of what is almost universally regarded as a burlesque.

"I, therefore, respectfully decline to further attend personally these hearings until notified by my counsel to appear in defense of the charges on which I was suspended, when, if ever, you address yourselves to them."

(2) Trustee Raymer, a minority member of the school board, openly rebelled at the conduct of the trial. His position and some of the repartee can be shown in the following verbatim account as printed in the Chicago *Tribune*:

Trustee Raymer and school-board attorney had been having a wordy tilt.

Noise Interrupts Debate

Two minutes of noise and confusion interrupted at this point, while Righeimer and Raymer both strove vainly to be heard. Raymer won.

"I'm perfectly willing to listen," he shouted, pounding his desk, "but I'm tired of being lectured to by a long-haired gentleman from Seattle and another gentleman from New York, who admits he was editor of a publication that during the war was suppressed.

"Furthermore, I don't want to hear any more personal opinions on patriotism from Charles Edward Russell, an avowed and widely known Socialist, whose greatest ambition is realized when he sees nation pitted against nation.

"The sooner you get down to real concrete propositions and cease dealing with such opinions the better. I can't conceive of the fairness of this trial to date. There's got to be more testimony given before you can justly call it evidence.

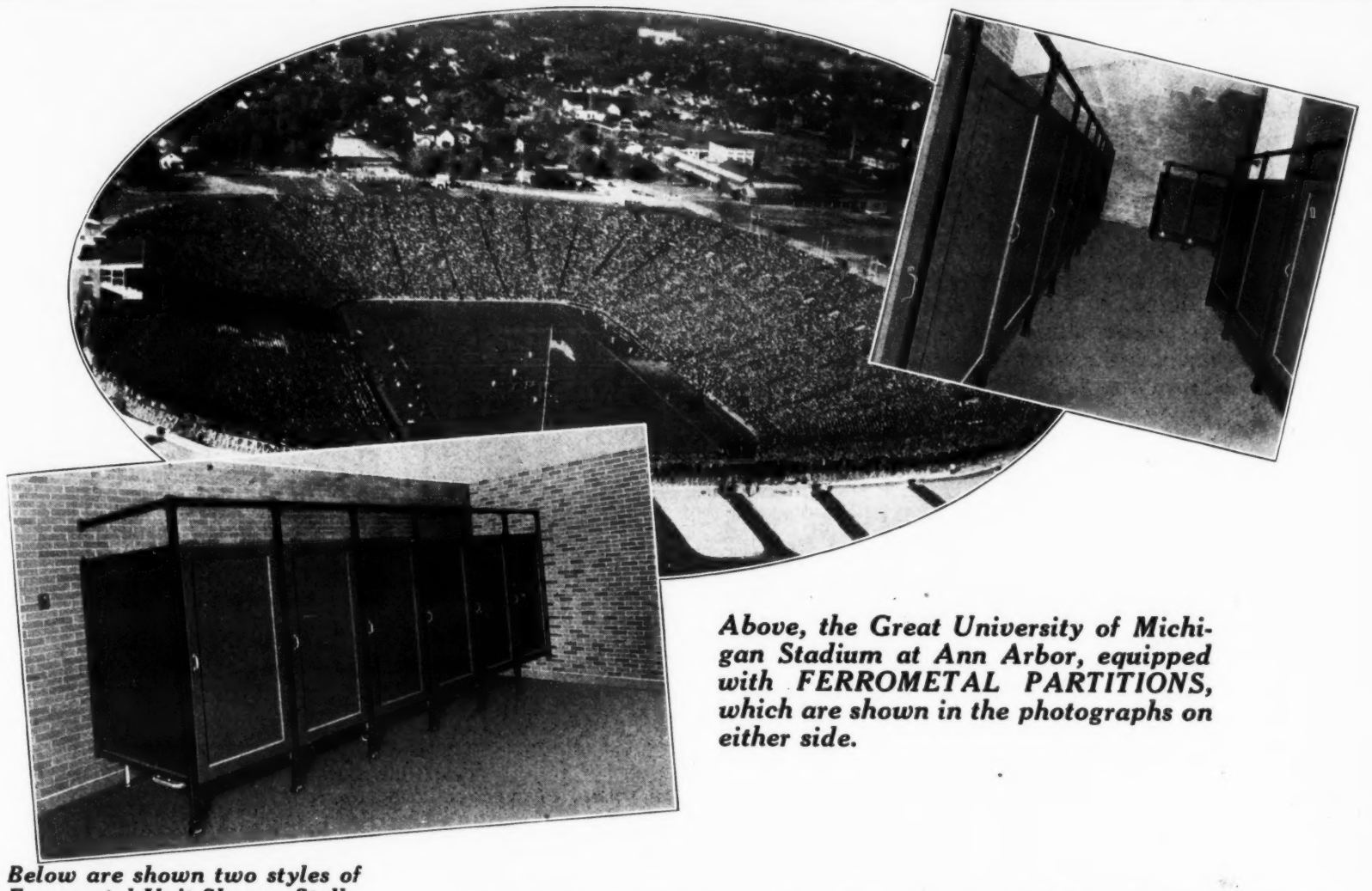
"There's no doubt in my mind or in your mind that a number of history books used under McAndrew were adopted by a former board of education. If McAndrew indorsed them he did so because he believed those histories told the truth."

McAndrew Partisans Cheer

Another storm ensued while the McAndrew sympathizers in the gallery took their inning. When the cheers subsided, President Coath entered the lists.

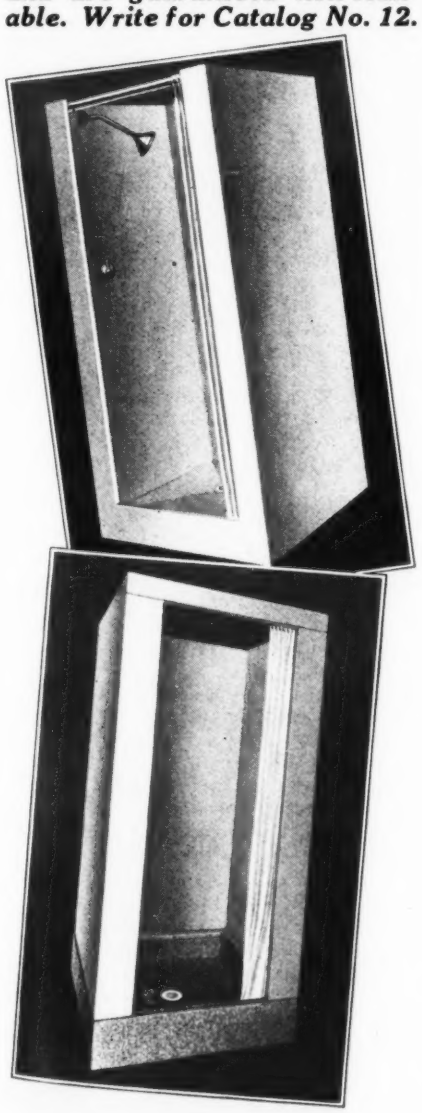
"Do you believe, Mr. Raymer," he asked, "that the omission of Kosciusko and Pulaski from the textbooks was proper?"

(Concluded on Page 156)



Above, the Great University of Michigan Stadium at Ann Arbor, equipped with FERROMETAL PARTITIONS, which are shown in the photographs on either side.

Below are shown two styles of Ferrometal Unit Shower Stalls. You will note from the illustrations that they are made in styles to fit every requirement, with and without terrazzo base. Practical–Durable–Economical and are guaranteed non-leakable. Write for Catalog No. 12.



The Osborn Engineering Company of Cleveland, Ohio,

and

James Leck Company, Contractors of Minneapolis, Minnesota,

selected FERROMETAL PARTITIONS for the one hundred and ten toilet compartments in the Great University of Michigan Stadium, because they were convinced that no better equipment was procurable, — no similar equipment was equal in strength, finish, and general desirability.

For school work, FERROMETAL PARTITIONS are without peer. They stand the hardest kind of usage, retain their attractive appearance, and stand up under severest abuse.

Satisfied users are our best advertisements, and there is little we can add to what they will tell you.

Specifications of FERROMETAL PARTITIONS: All Ferrometal Partitions and doors are made of Keystone copper-bearing rust-resisting steel. There are no open seams or butt joints. No dirt catching moldings or channels. Partitions and door panels are made of No. 16 and 18 gauge material. Rigid inter-locking panel and door construction. All joints welded and homogeneous. Kalamein sound-proof door stiles and No. 18 gauge lead-coated, copper-bearing steel panels. The hinges are of the heavy universal adjustable type, securely bolted through post. Heavy nickel-plated brass door bolt and pull. The easy-to-clean, rust-resisting and flexible finish required for large panel surfaces reduces maintenance cost to a minimum.

No special labor required for installing. No drilling nor cutting in the field. Complete erection drawings with every installation.

Complete installation service by our representative in your city.

We invite those who are interested to send our Service Department rough layout or blue prints of their plumbing requirements for figuring. Our catalog No. 11 will be cheerfully forwarded on request.

FERRO METAL TRADE MARK

LITTERER BROS. MANUFACTURING CO.

3022-3032 North Rockwell Street

CHICAGO ILLINOIS

Representatives in All Principal Cities

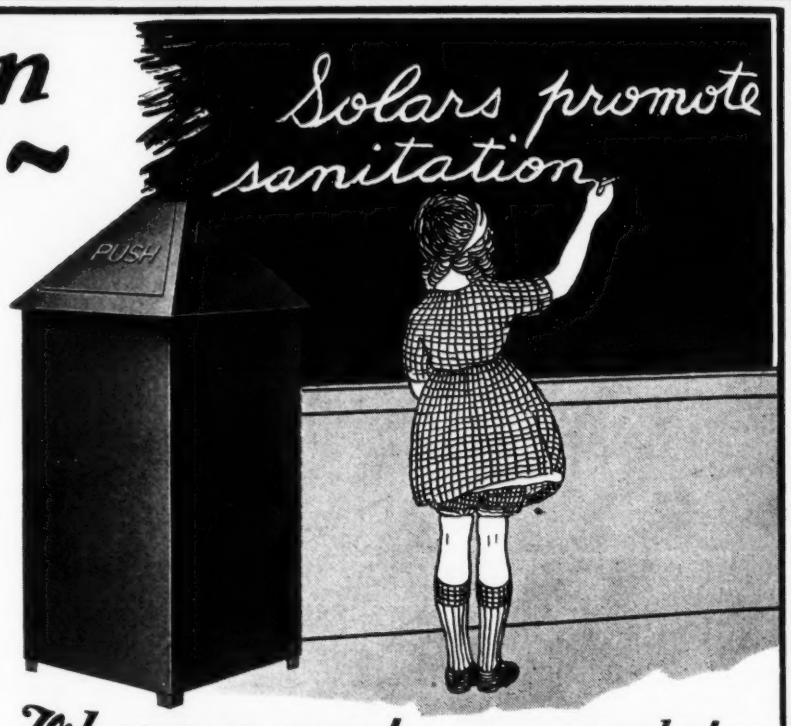
The first lesson in CLEANLINESS~

The value of SOLAR self-closing RECEPTACLES in the teaching of cleanliness cannot be over-estimated. Children and grown-ups, too, find the easy swinging, self-closing cover a constant reminder and positive inducement to neatness wherever waste accumulates.

The SOLAR patented gravity swinging top makes the receptacle silent in operation and closed at all times; replacing unsightly open containers and keeping the premises cleaner than ever before.

The SOLAR is sanitary, simple, automatic—noiseless, odorproof, verminproof, fireproof. Ever ready, easy to use, easy to empty. It is built to endure long severe service.

It can be purchased in nine different sizes and finished in gray, green, white, grained mahogany, to harmonize with all surroundings.



Wherever waste accumulates

Write for detailed information and name of nearest distributor.

SOLAR-STURGES MFG. CO., Melrose Park, Illinois.

SOLAR *Self-Closing* RECEPTACLES

(Concluded from Page 154)

RAYMER—"I believe that if these patriots were overlooked it was an error. We are all human and all of us commit errors. I do not approve of the omission of any men who contributed to the glory and freedom of the United States. I hold no brief for McAndrew. I have never talked with him privately in my life. Are we here to try a man on charges or are we doing something else? That's the question I want answered and substantiated."

In the meantime, two aldermen and a city prosecutor are said to have initiated mass meetings among the Polish citizens of Chicago to protest against Mr. Raymer's support of McAndrew. The *Tribune* charges that it is an attempt to "injure Mr. Raymer financially." Mr. Raymer's banks are said to be heavily patronized by Polish people of Chicago. Mr. Raymer has announced that he will resign, but not until the end of the McAndrew trial. Dr. Otto L. Schmidt, another McAndrew supporter, is also said to have declared that he will resign at the conclusion of the trial.

MR. HAVILAND STEVENSON PASSES ON

Mr. Haviland Stevenson, president of Silver, Burdett & Company, textbook publishers, since 1914, died on December 1, after a lingering illness, at his home in Arlington, Mass. Mr. Stevenson was connected with the firm of Silver, Burdett & Company for more than a quarter of a century, first as field agent, and later as its president. Having wide opportunity for personal contacts, he drew countless friends from among the teachers, school executives, and publishers of the country.

Mr. Stevenson was born at Aiken, S. Car., in January, 1864. Following his graduation from college, Mr. Stevenson entered the law school of the University of Virginia. He practiced for a time, but later entered the employ of the law department of the Interstate Commerce Commission, and finally of the U. S. Treasury Department.

Mr. Stevenson entered the employ of Silver, Burdett & Company in 1900, and won rapid advancement. In 1914 he was called to take the office of president to succeed Mr. Arthur Lord who had resigned from the office. In spite of financial and general agency duties, Mr. Stevenson found time to support a large expansion program. An important new series of books was contracted for and the main office of the firm was moved from Boston to Newark, New Jersey. During the last few years Mr. Stevenson had the satisfaction of seeing the results of his work in the professional and financial success of the company.

Mr. Stevenson is survived by one sister and one brother.

HOW McKEESPORT STAGED A BOND CAMPAIGN

The question of meeting expenditures for new schoolhouse projects has given school administrators throughout the United States considerable concern in recent years. The newer demands made upon the several school units through the expansion of activities, the lengthening of the school life of the average pupil, and the demand for more utilitarian structures, has called for expenditures which exceed by far those engaged in in previous years.

While the taxation rate for the general maintenance of the schools has risen, the demand for new school buildings also continues, and must be met. An uninformed taxpaying public is apt to become restive and may seriously question the expediency of this or that new project. Thus, it has happened in recent years that bond issues for new school buildings have not always met with success. While the school authorities were convinced that new schools were needed, the general public was not.

This has led to a study of the subject and has prompted the formulation of well-planned campaigns designed to instruct the public in the needs of the schools, and to present the wisdom of this or that particular project. The publicity side of such campaigns have therefore been studied with great care, and have led to the issuance of pamphlets, booklets and newspaper advertising.

The campaign staged at McKeesport, Pa., which called for $1,500,000 employed a series of four half-page and nine full-page newspaper advertisements, proceeded upon the idea that the taxpayer must be informed as to just what was implied in the bond issue for new school buildings. The campaign resulted in a complete success.

For each advertisement the board of school directors, which consists of Will Pfaff, president; A. C. Kreiss, vice-president; Dr. H. S. Arthur, R. M. Baldridge, J. F. Calhoun, J. D. Evans, T. D. McKee, Elizabeth H. Newlin, and Dr. A. D. Zeller, assumed full responsibility for the statements presented.

SCHOOL CROWDING IN NEW YORK

—Supt. W. J. O'Shea of New York City, in a recent report on school enrollment, shows that there has been a slight decrease in school congestion since the opening of the current term in September but a marked increase over a year ago. The figures show that there were 69,664 pupils on part time in the day schools in October, which was a decrease of 538 from September, but a gain of 1,856 over October a year ago. In addition, there were 60,382 pupils enrolled in special-session classes, an increase of 8,058 over the twelve-month period.

The report shows that the total school registration on October 31 was 1,019,678, or an increase of 17,953 over October, 1926. Enrolled in the elementary schools were 872,907 pupils, of whom 49,247 were on part time, and 31,859 on special schedule. This was a twelve-month gain of 9,553, a part-time increase of 3,797, and a special-schedule advance of 2,810.

The high-school enrollment of 135,826 was 7,017 over last October. The part-time total of 20,417 was 1,941 less than a year ago, which was offset by a special-schedule increase of 4,576 to a total of 27,206.

In the elementary schools the part-time increase was restricted to the Boroughs of the Bronx and Brooklyn. Manhattan had no part-time classes and Queens reported a decrease of 1,394, while Richmond showed a drop of 710 over last October. The largest increase was in the Bronx, which reported 4,202 pupils on part-time, an increase of 3,533.

Part time in the high schools was reduced in every borough except the Bronx. The total of 20,417 was 1,941 less than a year ago. The Bronx had 6,893 on part time, an increase of 2,365. The largest reduction was in Queens, which reduced its total to 1,851, a decrease of 2,531.

BUSY SUPERINTENDENTS

—Supt. George Morris of Bloomfield, N. J., has issued a report in which he shows that the enrollment for the school year 1926-27 reached a total of 6,044, which is a substantial increase over last year's enrollment of 5,655. The total number of days' attendance was 932,000, or an increase of 97,000 days over the attendance of last year.

The number of pupils enrolled in the evening school reached a total of 380 and the total attendance reached 10,193 evenings. The figures indicate an increase of one per cent in enrollment and a decrease of two per cent in attendance as compared with the year 1925-26.

The WALLMARK of Quality

1927

Saw the *Triumph* of Hockaday

The tide is turning. Instead of asking, "What does it cost a gallon?" buyers of paint are realizing that paint that is cheap in the can is expensive on the wall.

Hockaday brings-down up-keep. It spreads farther, prevents suction and air checking — and can be washed repeatedly.

Architects, apartments, hotels, and industrial plants are standardizing on Hockaday. As a result, 1927 records a substantial increase in business; convincing testimony to Hockaday's proved economy.

HOCKADAY, Inc.

1823-1829 CARROLL AVE., CHICAGO, ILLINOIS

The Hockaday Co. of San Francisco
206 Ninth St., San Francisco, Calif.

D. E. Fryer & Co. — Seattle
Tacoma, Spokane, and Portland

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420 Douglas Bldg., Los Angeles, Calif.

HOCKADAY
THE WASHABLE PAINT FOR ALL INTERIORS

ON REQUEST—A BOOK OF VALUABLE FACTS, "PAINT MILEAGE"

Floor Cleaning Compounds
that save money and save floors

THE PROPER care and treatment of floors demands the right cleaning compound for each type of flooring. It's not enough that it shall clean thoroughly and rapidly—but it must have no injurious effect on the floor itself. Many costly floors have been ruined by strong acids, alkalis or abrasives.

Our Floor Department

will help you. Every cleanser we offer serves a specific need and positive uniformity is assured. We invite you to submit your problems in floor cleaning to us, and we'll suggest the right cleanser to assure satisfaction.

Rex Pine
Liquid Scrub Soap
saves time and will not streak floors. Convenient to use. Has fragrant pine woods odor.

Rex Potash
Liquid Scrub Compound
The ideal cleaner for Tile, Marble, Mosaic and Flint-Tile floors. Removes, prevents discoloration.

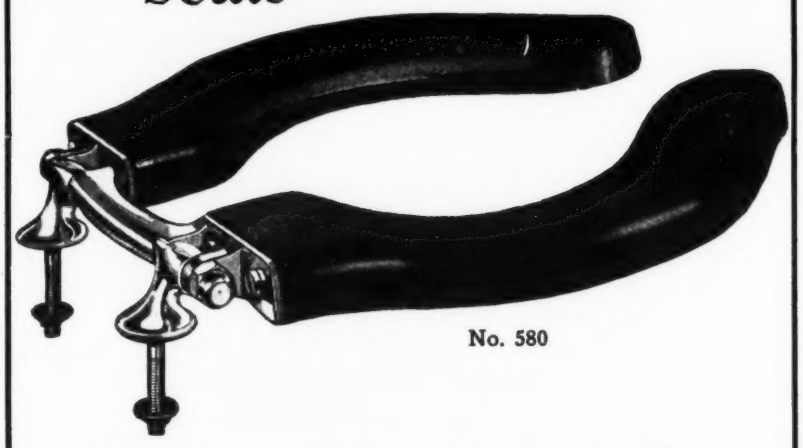
Lino-San
Liquid Linseed Soap
for soft texture and painted surfaces. Ideal for cleaning walls.

Liqua-San
Liquid Toilet Soap
is made of purest materials and cannot smart or burn the tenderest skin. Costs less than bar soap in actual use. Dispensers at cost.

The Huntington Laboratories *Incorporated*
HUNTINGTON, INDIANA

No expense after the first *reasonable cost*

Never-Split
Evernu
Everlasting Hard Rubber
Seats



No. 580

The original price of Evernu seats—a surprisingly ***low price*** it is, too—is all they'll ever cost. They'll require no refinishing in all the years to come, no smoothing of scarred surfaces, no repairing of loosened joints and hinges. Evernu's well-fashioned beauty is everlasting, always new.

Special hard rubber is molded by the ***patented*** Evernu process, into seamless, jointless, practically indestructible units, to form Evernu seats. The glossy surface—jet black or mahogany—is unharmed by constant sterilizing with dilute alcohol. Can't warp, chip, or crack. ***Unconditionally guaranteed.***

There are Evernu models for every type of bowl. Write for our interesting new booklet. It will help you decide the seat question most economically and satisfactorily.

Schools Completely Equipped with "Evernu" Seats include those at:

Chicago, Ill.
New York, N. Y.
Los Angeles, Calif.
San Francisco, Calif.
Indianapolis, Ind.
Evansville, Ind.
Harrisburg, Pa.
Kansas City, Mo.
Seattle, Wash.
Baton Rouge, La.
Tacoma, Wash.
Philadelphia, Pa.
Cleveland, Ohio.
Mobile, Ala.
Dallas, Texas.
Shreveport, La.
Pine Bluff, Ark.
Eugene, Oregon.
Long Beach, Calif.
Pasadena, Calif.
South Bend, Ind.
Columbia, S. C.
Terre Haute, Ind.
Baltimore, Md.
Dayton, Ohio.
Cincinnati, Ohio.
Oakland, Calif.
Amarillo, Texas.
Richmond, Va.
Toledo, Ohio.
San Antonio, Texas.
Houston, Texas.
St. Joseph, Mo.
Salem, Oregon.
Winston-Salem, N. C.
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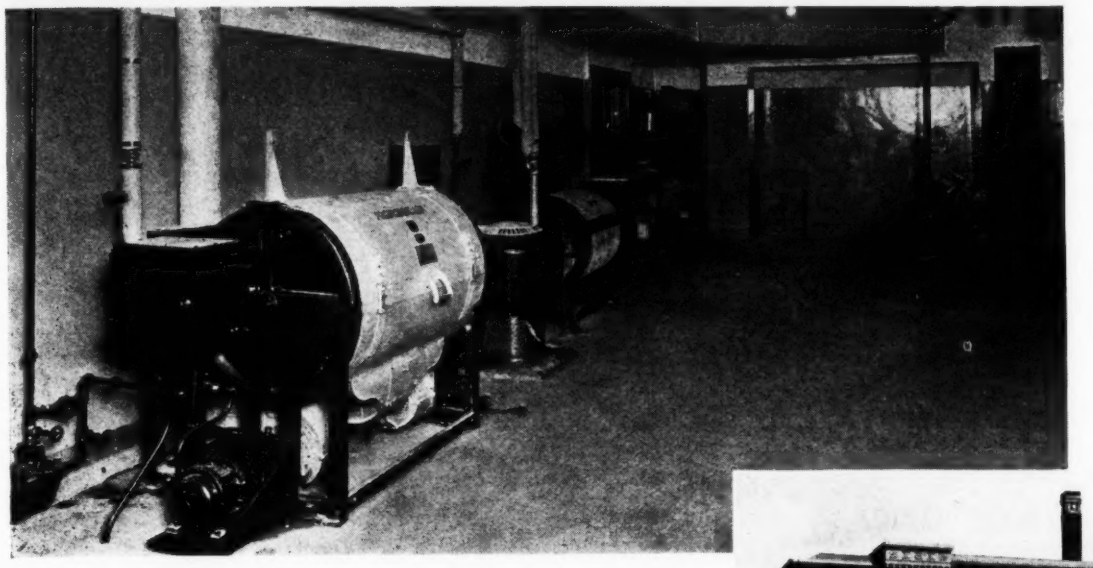
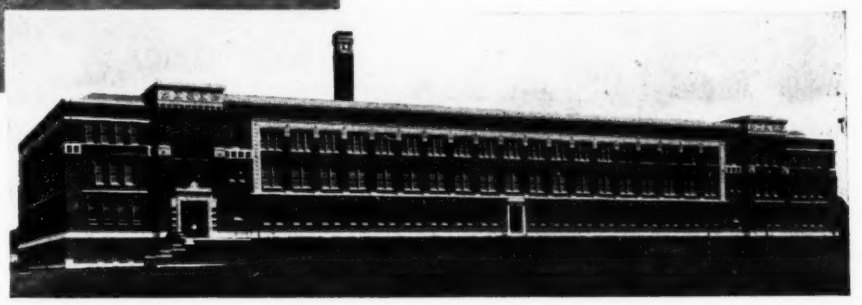
Never Split Seat Company
Founded 1905
DEPT. 131—EVANSVILLE, IND., U. S. A.
Largest Manufacturers of Toilet Seats in the World.



This compact but efficient laundry unit at Central Junior High School makes it unnecessary to keep on hand an extensive supply of linen and uniforms, and insures prompt and perfect service.

Central Junior High School, Kansas City, Mo.



"Not only *practical* but *indispensable*"

that's the way the School Board puts it

Central Junior High School is one of the modern high schools of Kansas City which has its own laundry—an "all-American" department. And with the laundry under the direct control of the school officials, such articles as uniforms, cafeteria linens, laboratory aprons and towels can be handled quickly and inexpensively.

The Board of Education of Kansas City will be glad to tell you of the advantages of having a school maintain its own laundry — tell you, too, how at the Central Junior High School the laundry is not only practical, but indispensable.

May we add a word about some of the other school laundries we have planned and installed? A card will bring you some very interesting information.

THE AMERICAN LAUNDRY MACHINERY COMPANY, Norwood Station, Cincinnati, Ohio

The Canadian Laundry Machinery Co., Ltd.
47-93 Sterling Road, Toronto 3, Ont., Canada

Agents: British-American Laundry Machinery Co., Ltd.
Underhill St., Camden Town, London, N.W.1, England

THE HIGH-SCHOOL LIBRARY

(Concluded from Page 74)

and the gymnasiums are so far removed that there can be no disturbing noises from the activities of these departments.

3. The separate library wing makes it possible to have windows on three sides. The ceiling height of two stories will provide ample natural lighting and yet allow the books to be stored in wall shelves seven feet high. This conserves the floor space which would otherwise be required for book stacks. The high windows also prevent light glare; but in the large bay windows are of the usual height from the floor, thus avoiding the effect of being walled in and adding much to the attractiveness of the reading room.

4. Two conference rooms and librarian's office and workroom are provided.

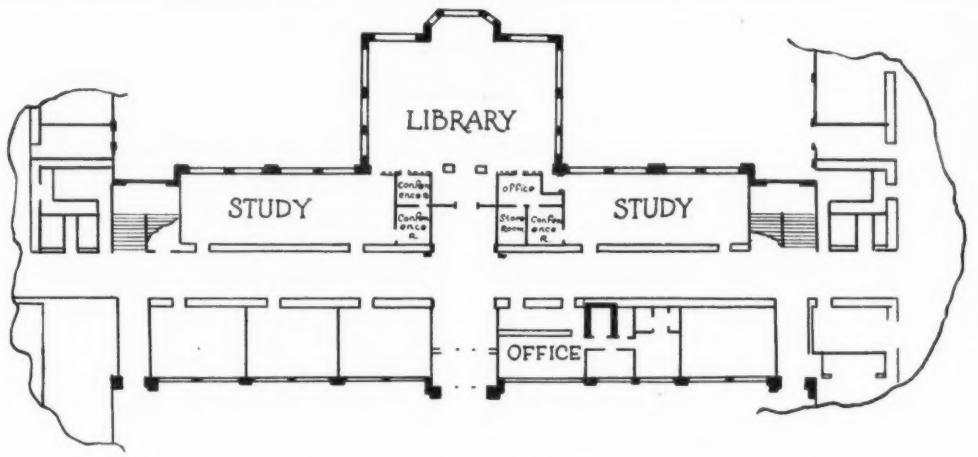
5. The reading room is large enough to seat 125 students, which is 10 per cent of the school's operating capacity.

6. The library is opposite the main entrance which makes it readily accessible to the public for evening use. When so used collapsible iron gates are drawn from each side of the entrance lobby across the main corridor, and thus all passage to the remainder of the building is shut off.

To Meet Community Needs

It is evident that the library group planned for this school is admirably adapted to meet the demands that will be placed upon it; it is an excellent example of what can be done at a moderate cost if the library is designed with a complete understanding of its functions in the school and the community.

In conclusion, it may be said that the next few years must see a marked improvement in the library equipment of our secondary schools, or little progress can be made in carrying out the program that modern educational philosophy has set before us. Authoritative standards for library design and organization are now available. School administrators must acquaint themselves with these standards and must see to it that they are applied in the construction of schools. For buildings already constructed with inadequate provision for the library, the addition of a small wing, or a slight remodeling of a part of the building, may easily give excellent library facilities. The day of the little red schoolhouse is gone forever. The complex life of today makes the problem of teachers difficult enough without the handicap of the lack of essential instructional equipment.



SKETCH PLAN OF RACINE HIGH-SCHOOL LIBRARY SHOWING ITS RELATION TO OTHER DEPARTMENTS.

THE CALIFORNIA SCHOOL SYSTEM

—California has 39 fewer school districts today, than it had a year ago. There are now 3,260 school districts in which are included 389 high school districts. About 60 per cent of the total districts maintain one-teacher schools.

The interest on school bonds in California amounts to about $10,000,000 annually figuring $200,000,000 at 5% interest.

Education takes a considerable part of the revenues of the county governments. Last year the counties spent $40,842,878.46 for education while the districts spent nearly twice as much, or $80,760,808.32. The state contributed $21,756,834.25 and the federal government spent $544,213.87 in fostering education in California. These staggering figures do not include payments for interest and redemption of bonds which come out of other funds and total over $15,000,000 annually.

The high school and elementary districts have gone in debt over $200,000,000 for lands, buildings, and equipment. This is an average of $187.35 per pupil in average daily attendance in elementary school and $553.56 for every pupil in average daily attendance in high school. This staggering debt could be much reduced by eliminating many small inefficient schools with their high per-capita costs and by managing school finance and affairs in a more businesslike manner.

Nearly 800,000 students were in average daily attendance last year in the public schools—a number greater than the population of the whole state fifty years ago.

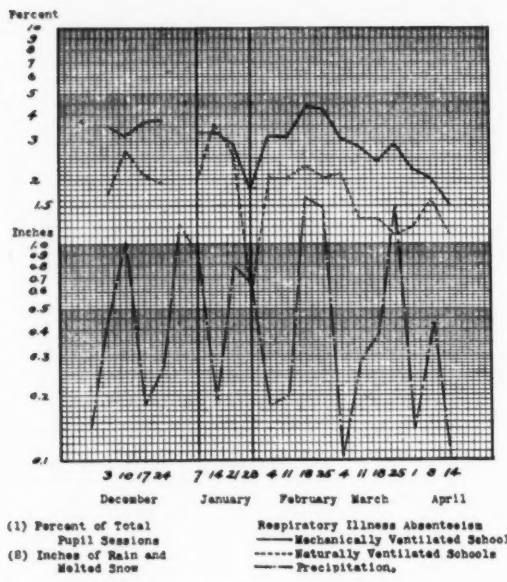
THE SCHOOL VENTILATION STUDIES OF THE NEW YORK VENTILATION COMMISSION

(Concluded from Page 59)

CHART II.

Respiratory Illness Absenteeism
In Mechanically and Naturally Ventilated Schools (1) and Precipitation (2)
By Weeks

SCHOOL VENTILATION STUDY -- SYRACUSE, N.Y. (1926 - 1927)



A word of explanation before passing to Chart II! The two heavy vertical lines in the charts mark the first week after the Christmas holidays and the first week of the new term respectively. This second point is of interest because for the two preceding weeks, all the curves of absence drop. The week ending January 21 was the week of Regents Examinations; lower grades were excused, and higher grades operated under the unusual conditions of examinations. The average absenteeism was probably less than it would have been had normal conditions prevailed. The week of January 28 was the first week of the new term when pupils who ultimately joined the classes were not counted absent because they had not registered. This accounts for the dip of all the absence curves in this week.

Chart II reproduces the curves of respiratory-illness absenteeism shown in Chart I, but the lowest curve on this chart shows the precipitation—rainfall and melted snow. Because our study did not get started until late in the school year, and we had but four weeks' records before the holidays and because of the facts regarding examinations and irregularities in the records at the start of the new term, I am going to restrict my consideration of these curves to the 11-weeks period—from January 31 to April 14.

Commencing with the week ending February 4, it will be noticed that there is a remarkable correspondence between the peaks of the upper curve (respiratory-illness absenteeism in mechanically ventilated schools) and the bottom curve (precipitation). As the precipitation increases in the week ending February 18, the respiratory-illness absenteeism increases. As the weekly precipitation remains high (1.5 in.) the respiratory-illness absenteeism remains stationery, but as the precipitation declines in the week ending March 4, the upper curve also falls. Only when the precipitation goes up markedly again, in the week ending March 25, is there any halt in the downward trend of the respiratory-illness absenteeism rate, and when the precipitation declines again the respiratory-illness absentees also decline. These observations do not hold at all for the respiratory-illness absenteeism in the naturally ventilated schools. *There is, then, an apparent relationship between precipitation and respiratory illness in the mechanically ventilated schools which does not exist in the naturally ventilated schools.*

What is it? This is pure conjecture, because there is not a single observation to support one contention, which will, however, probably not be questioned.

It is my conclusion that the higher rate of air change in the mechanically ventilated rooms (I assume this) evaporated the moisture on the shoes and clothing of the pupils in these rooms so rapidly as to absorb their body heat so much as to chill many of them, either sensibly or insensibly, and as a result of that chilling, they developed respiratory illness from the organisms generally present in noses and throats during the winter season.

Temperatures in the two types of schools were not widely different, relative humidities (from a single series of observations, unfortunately) were shown to be approximately the same. The great difference between the two systems of ventilation is the rate of air change, and in view of certain other evidence as well as that here suggested, it is my belief that the higher respiratory illness in mechanically ventilated schools is due to the fact that they have about three or four times as much air change as is desirable.

It has been pointed out above just how important factors of age and race stock are in such a study as this, and how crude data which do not take these factors into consideration may lead to wholly erroneous conclusions. With that fact in mind the data collected in this study have been recast with the elimination of Salem Hyde from the mechanically ventilated schools and Townsend from those ventilated by natural means. This leaves Seymour and Danforth schools representing mechanical ventilation, and Montgomery and Merrick representing natural ventilation. Seymour and Montgomery are in the same general neighborhood and are attended by much the same type of pupil. The same observations hold for Danforth and Merrick.

In Tables 1A, 2A, and 3A, the summarized information for Grades 2 to 6 in these schools is presented in the same manner as Tables I, II, and III presented the crude findings.

Reference to the data at the bottom of Table 1A shows that whatever trace of advantage of age and race stock is left favors the mechanically ventilated schools, which, nevertheless, show 29 per cent more total absenteeism, 32 per cent more respiratory-illness absenteeism, and 18 per cent more respiratory illness among pupils present than do the naturally ventilated schools. These points are brought out in Chart III.

CHART III

ATTENDANCE AND HEALTH RECORDS
In
MECHANICALLY AND NATURALLY VENTILATED SCHOOLS
SCHOOL VENTILATION STUDY -- SYRACUSE, NEW YORK (1926 - 27)

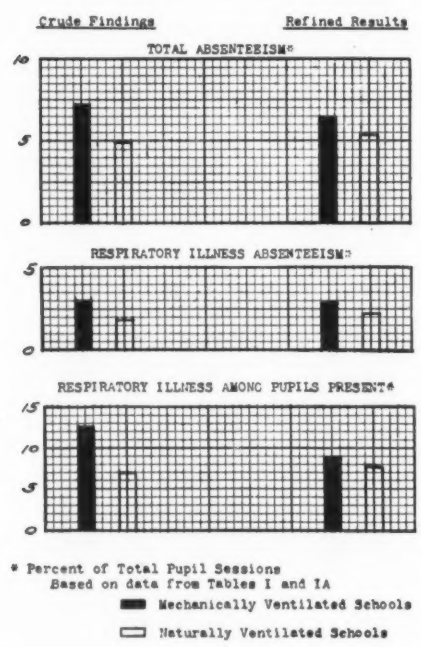


TABLE 1A—SUMMARIZED ATTENDANCE AND HEALTH RECORDS
According to Type of Ventilation
With Room Temperatures, Age and Nationality of Pupils Balanced
SCHOOL-VENTILATION STUDY—SYRACUSE, NEW YORK (1926-27)

Attendance and Health Records	Mechanically Ventilated Schools	Naturally Ventilated Schools	Excesses in Mechanically Ventilated Schools
A. Total Pupil Sessions	166,245	95,425	.....
B. Total Absences	11,687	5,192	.....
Per cent of Total Pupil Sessions	7.0	5.4	29%
C. Absences due to Respiratory Illness	4,839	2,066	.....
Per cent of Total Pupil Sessions	2.9	2.2	32%
Per cent of Total Absences	41	40	.....
D. Pupil Sessions Attended	154.558	90,233	.....
Per cent of Total Pupil Sessions	93.0	94.6	-1.6%
E. Respiratory Illness Among Pupils Present	14,590	7,367	.....
Per cent of Total Pupil Sessions	8.8	7.7	14%
Per cent of Pupil Sessions Attended	9.4	8.2	14%
F. Respiratory Illness Among Pupils Present and Absent	19,429	9,433	.....
Per cent of Total Pupil Sessions	11.7	9.9	18%
G. Mean Temperatures (°F.)	70.0	70.3	.....
H. Average Age of Pupils, Years	10.0	9.5	.....
I. Percentage of Children of American Parentage	71.0%	76.0%	.....
J. Number of Pupils	1,086	557	.....

TABLE 2A—ATTENDANCE AND HEALTH RECORDS IN TWO MECHANICALLY VENTILATED SCHOOLS
SCHOOL-VENTILATION STUDY—SYRACUSE, NEW YORK (1926-27)

Attendance and Health Records	SCHOOLS Seymour	Danforth	Totals
A. Total Pupil Sessions	97.360	68,885	166 245
B. Total Absences	7.094	4,593	11,687
Per cent of Total Pupil Sessions	7.4	6.7	7.0
C. Absences due to Respiratory Illness	2.396	2,443	4,839
Per cent of Total Pupil Sessions	2.5	3.5	2.9
Per cent of Total Absences	34	53	41
D. Pupil Sessions Attended	90.266	64 292	154.558
Per cent of Total Pupil Sessions	92.6	93.3	93.0
E. Respiratory Illness Among Pupils Present	9.827	4,763	14,590
Per cent of Total Pupil Sessions	10.1	6.9	8.8
Per cent of Pupil Sessions Attended	10.9	7.4	9.4
F. Respiratory Illness Among Pupils Present and Absent	12.223	7.206	19 429
Per cent of Total Pupil Sessions	12.6	10.4	11.7
G. Mean Temperatures (°F.)	70.2	69.5	70.0
H. Average Age of Pupils, Years	10.2	9.5	10.0
I. Percentage of Children of American Parentage	60.0	85.5	71.0%
J. Number of Pupils	707	379	1,086

TABLE 3A—MEAN TEMPERATURES AND ATTENDANCE AND HEALTH RECORDS IN TWO NATURALLY VENTILATED SCHOOLS
SCHOOL-VENTILATION STUDY—SYRACUSE, NEW YORK (1926-27)

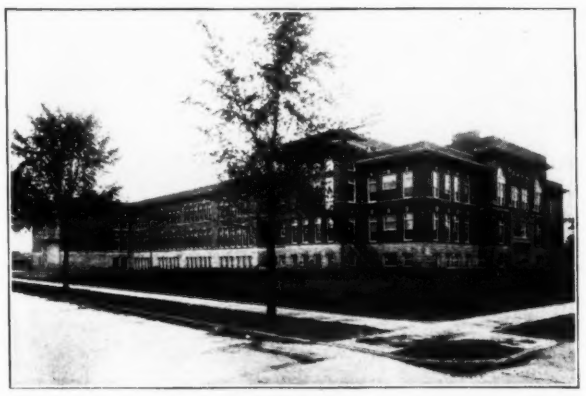
Attendance and Health Records	SCHOOLS Montgomery	Merrick	Totals
A. Total Pupil Sessions	54.346	41.079	95.425
B. Total Absences	3,523	1.669	5.192
Per cent of Total Pupil Sessions	6.5	4.1	5.4
C. Absences due to Respiratory Illness	1.089	977	2.066
Per cent of Total Pupil Sessions	2.0	2.4	2.2
Per cent of Total Absences	31	59	40
D. Pupil Sessions Attended	50.823	39 410	90.233
Per cent of Total Pupil Sessions	93.5	95.9	94.6
E. Respiratory Illness Among Pupils Present	4.920	2.447	7.367
Per cent of Total Pupil Sessions	9.1	6.0	7.7
Per cent of Pupil Sessions Attended	9.7	6.2	8.2
F. Respiratory Illness Among Pupils Present and Absent	6.009	3.424	9 433
Per cent of Total Pupil Sessions	11.1	8.4	9.9
G. Mean Temperatures (°F.)	71.7	68.3	70.3
H. Average Age of Pupils, Years	9.9	8 9	9.5
I. Percentage of Children of American Parentage	65.0	91.4	76.0
J. Number of Pupils	325	232	557

IV. Conclusions

Conclusions must not be deduced too hastily or too rigidly from the findings here reported. As has been stated, the studies were of a preliminary nature only, and this is simply a progress report of the work done. Both studies are being continued during the current school year (under conditions that promise more reliable results) in the hope that our findings may contribute to the ultimate establishment and general acceptance of standards for the most healthful air conditions in school classrooms, together with the most satisfactory methods of obtaining and maintaining them.

DURABILT STEEL LOCKERS

Provide The Necessary Safety Factor



Muessel School,
South Bend, Ind.

Recessed Corridor Lockers,
Muessel School.

Anyone interested in steel lockers will be convinced, after making a tour of inspection of different schools, that pupils know how to test lockers.

A kick—a slam—a bang—these are only a few of the many tests lockers are put to in America's largest "proving grounds"—our Public Schools.

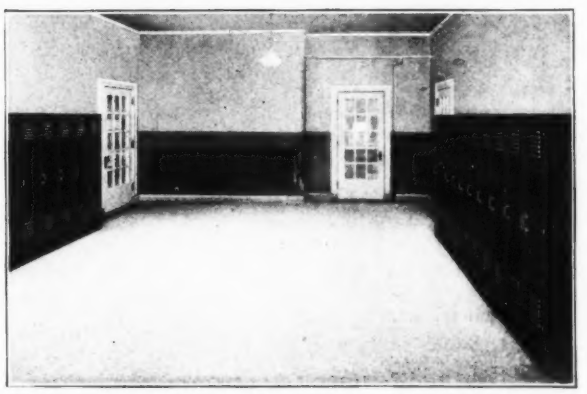
Considerable pushing, tussling, and scrambling occurs even in those schools where rigid discipline is exercised. Attempts to prevent it frequently fail because play-loving boys just can't help being otherwise.

This fun in corridors and locker rooms can result in expensive destruction of property if the proper selection of locker equipment has not been made.

Durabilt Steel Lockers are designed and built with the definite object of making them strong enough to withstand the most severe tests of actual school use.

The exceptional quality of Durabilt does not necessarily mean a high-priced locker, in fact, our prices will be found gratifyingly moderate.

We invite you to investigate the many advantages and outstanding features of Durabilt Products. Send today for our loose-leaf catalog which gives complete up-to-the-minute information on the Durabilt Quality Line of Steel Lockers, Storage and Wardrobe Cabinets. Your request to our nearest Sales Office or direct to us at Aurora places you under no obligation.



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You will be surprised to learn how little you need spend for an equipment which will give your pupils the advantages of real laboratory work. Write for details on the Harcourt Planning Service for High School Laboratories.

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CAMBRIDGE, MASSACHUSETTS

for Best Results—Harcourt Laboratory Equipment

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Standard for Education Since 1895

THE COST-PLUS SYSTEM OF LETTING CONTRACTS FOR SCHOOLS

(Concluded from Page 75)

the responsibility that through some mistake or oversight the actual building costs may exceed the appropriation, thereby causing serious embarrassment.

Under no consideration is a school district justified in entering into this form of contract except with an experienced contractor of unimpeachable integrity and good financial standing.

Modifications of the Plans

A contract so drawn that the contractor gets a percentage of the final costs seems to the writer wrong in principle, for it is certainly contrary to the contractor's financial interests to make the building cost less and is constantly open to suspicion.

There are modifications which offer worthwhile advantages, namely:

a) *Fixed Fee.* In which a certain sum is agreed upon as the contractor's compensation for his services and the use of his equipment in erecting the building as per plans and specifications. This contract is probably improved by taking a bid, previously submitted by this contractor, as a base price from which savings or increase in cost are split between the contractor and the school district. This places a premium on saving costs and a penalty on running over.

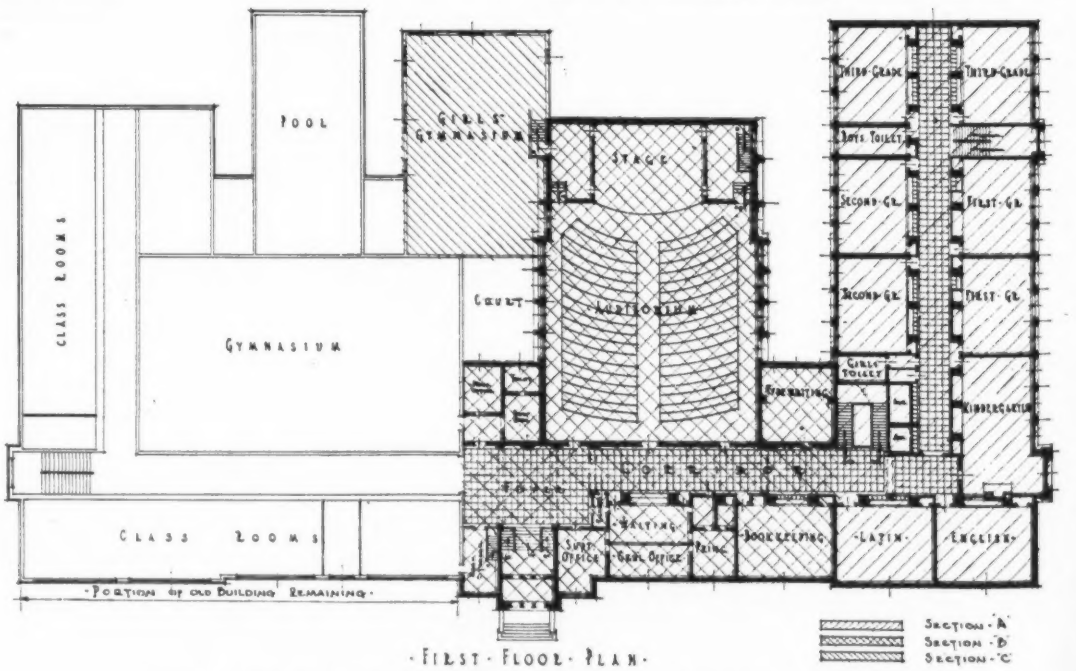
b) *Guaranteed Cost.* In this plan the contractor guarantees the cost not to exceed the amount of his bid, and splits any savings with the school district on a ratio agreed upon in this contract.

The reconstruction of the Bath (Mich.) consolidated school, recently destroyed by dynamite, is being carried on under the latter contract plan. Contractors have guaranteed the cost not to exceed the appropriation of $75,000 given by Senator Couzens, and further have agreed magnanimously to turn back to the school district any savings accruing in the process of building by reason of which the costs shall be less than $75,000. Building-supply and material companies are displaying the same spirit and furnishing their materials at cost, which will assist materially in creating a fund for much-needed furnishings.

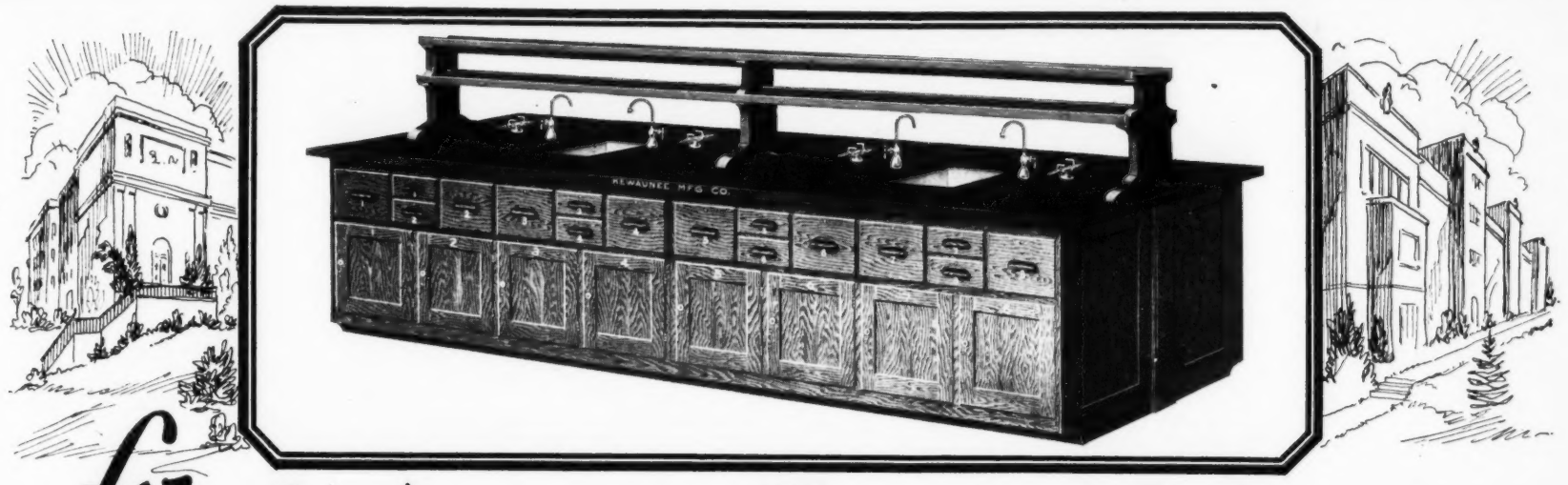
Every building erected on plans from our offices on the percentage, fixed-fee, or cost-plus plan has been completed for less than the lowest bids received, and with entire satisfaction to the owners.

The contract system of taking bids and erecting buildings, so generally employed in America, is undoubtedly very expensive and has many weaknesses. It is much simpler, however, for the architect and the school district, and it is the method contemplated by law—in fact, it is the only system to employ where competition is anticipated.

—Dr. Payson Smith of Massachusetts has reported that the total money from tax receipts to go to cities and towns as reimbursement for teachers' salaries will reach $5,057,705, which is an increase of $2,000,000 over the same figure last year. Each community receives $100, $150, and $200 per teacher from the income-tax funds, according to the individual rating.



FIRST FLOOR PLAN, WASHINGTON GARDNER HIGH SCHOOL, ALBION, MICH.
Warren Holmes-Powers Co., Architects, Lansing, Mich.



for the Average Chemical Laboratory at a very moderate price

Thousands of these Chemical Desks—No. 851—are in use in schools. It is undoubtedly the most popular Chemical Desk ever manufactured.

In it is embodied all the essential features of more elaborate and expensive desks. The general arrangement of drawers, plumbing, etc., follows closely along the lines that have proven most serviceable. It accommodates sixteen students, working in sections of eight.

SPECIFICATIONS

SIZE—Top measures 12 feet long x 4 feet wide; 3 feet high.

CONSTRUCTION—The Top is built of birch strips, matched, glued and dressed to 1⅝" thickness, which provides a hard, smooth working surface, and prevents warping. Cabinet built of solid, selected oak, and solidly constructed. Reagent bottle shelves are made with retaining rims.

DRAWERS — Each student is provided with two drawers and one cupboard. Large drawers measure inside 9½ x 15¾ x 8¼ inches. Smaller drawers measure inside 7½ x 15¾ x 3½ inches.

CUPBOARDS — Cupboards all measure inside 15¾ x 17½ x 15¼ inches.

LOCKS—Each student's section of two drawers and one cupboard is fitted with locks alike but different from any other set of locks on the desk. Masterkey to pass all locks furnished for the instructor.

PLUMBING—Supplied with two enameled iron sinks 16 x 24 inches, drain cast in; four nickel-plated pantry cocks, two of which have ¾ inch hose end for attaching aspirator; four double, long spout "Kewaunee" gas cocks (8 outlets; water, gas, and waste complete to the floor line).

NUMBER PLATES—Aluminum numbers on drawers and cupboards in series from "1" up on each order unless otherwise specified. A large and small drawer with each cupboard.

WEIGHTS—Crated: No. 850, 1575 lbs.

No. 850. Chemical Desk, enameled iron sinks. Without locks.
No. 851. Chemical Desk, same as No. 850, masterkeyed locks.
No. 852. Chemical Desk, same as No. 850, but soapstone sinks, 14 x 15 x 5½ inches with 4-inch nickel-plated overflows.

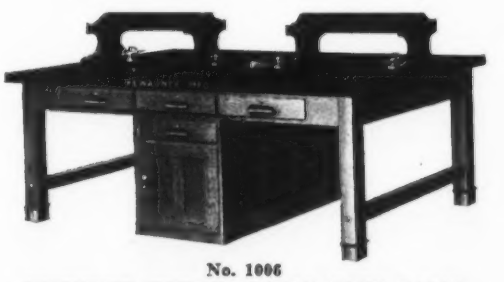
Kewaunee LABORATORY FURNITURE

In considering the Laboratory needs of your schools, whether for the teaching of Physics, Chemistry, Biology, Electricity, Drawing, Domestic Science or Manual Training, permit our Engineering Department to prepare blue print plans, showing the location of each piece of equipment with floor connections, locating pipe for drainage and the supply of hot and cold water, gas vacuum, compressed air, steam, distilled water, electricity, etc. We are at your service, without obligation.

FREE—THE KEWAUNEE BOOK

The most complete book of this industry, we believe, illustrating our entire line, some of the desks in natural colors. It will be sent without charge, prepaid, to any instructor or official who replies, giving his position and using the stationery of the institution. Address all inquiries to the factory at Kewaunee.

No. 699
PHYSICS TABLE
A simple, popular Kewaunee design, with gas connections and a wood crossbar.



No. 1006
STUDENTS' BIOLOGY LABORATORY TABLE
Where a complete work-table is desired, this will fill the need admirably.

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(Patent applied for)

Fourteen Distinctive Characteristics of The Law Non-colliding Chair

1. *NON-COLLIDABLE.* The chair is attached to the table by an oscillatory and swiveling mechanism so designed as to absolutely prevent contact between the chair and the desk or table, no matter in what position the chair may be.

2. *SELF-SUPPORTING.* The weight of the occupant is supported on the floor by a pedestal at the center of gravity, thereby relieving the desk or table of all strain.

3. *COMPACT.* It increases pupil capacity from 33⅓ to 100% over the space required by ordinary chairs.

4. *ADAPTABLE.* The principle of operation absorbs any possible unevenness in the floor.

5. *SILENT.* That part of the mechanism providing the oscillatory movement swivels in a pocket of oil and is supported on a cold rolled steel bearing. The natural results are silence and extreme ease of operation.

6. *ORDERLY.* It compels an orderly position at the desk or table as the mechanism prescribes the position of the chair yet permits of the utmost freedom of movement by the occupant.

7. *CONVENIENT.* When not in use, the chair can be instantly and noiselessly placed under the table or desk, thus permitting the occupant to use the latter from a standing position. The usual obstruction presented by chair legs is eliminated.

8. *DURABLE.* Though of comparatively simple design, it is so sturdily constructed that it will last a lifetime, in striking contrast to the life of the ordinary chair.

9. *COMFORTABLE.* The saddle seat and correct posture back compel an attentive sitting position and provide the maximum of comfort.

10. *STURDY.* The heavy skirting around the seat and the steam bent side brace arms contributing to the strength of the back posts make the chair practically indestructible.

11. *SAGLESS.* The mechanism supporting the chair is so constructed as to absolutely eliminate the possibility of "sagging," even after many years of use.

12. *SANITARY.* It simplifies the janitor's problems.

13. *ECONOMICAL.* It effects a saving in wear and tear on table tops. Where ordinary chairs are used the chairs are placed on the table tops during cleaning operations. The Law Non-Colliding Chair eliminates this unsatisfactory condition, thus protecting the table top from mars and scratches.

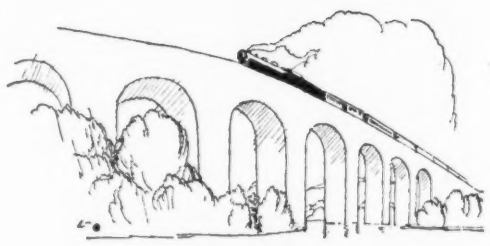
14. *ATTRACTIVE.* Its graceful lines and well-balanced proportions impart a pleasing appearance and convey the impression of an efficient management.

Progressive school executives will readily appreciate the adaptability of the Law Non-Colliding School Chair for use at teachers' desks, school clinic tables, office desks, and for students' use in biology, bookkeeping, chemistry, domestic art, domestic science, general science, physics, and typewriting departments. In fact, it is adaptable for use *at any table or desk* which provides twenty-two inches of knee space for the occupant of the chair and can be furnished with either right or left attachment as shown above.

Our exhibit of school seating equipment at the N. E. A. Convention in Boston will include the Law Non-Colliding Chair as well as our regular line of tablet arm, teachers', and chapel chairs.

Inquiries regarding selling arrangements are invited from School Equipment Dealers.

The B. L. Marble Chair Company
BEDFORD, OHIO, U. S. A.



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Selling organization for Sani-Onyx and Sani-Metal

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Student's Biology Table. A double-duty laboratory and recitation table, where it is preferable to have students face one way.

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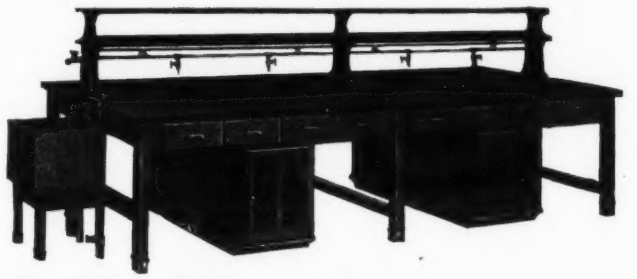
A rough sketch of the rooms you wish to equip will promptly bring our suggestion together with an estimate—this without obligation on your part..



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939
Student's Chemical and Agricultural Table. A dual-purpose laboratory table. Ample storage space for sixteen students. Open spaces below provide knee space for students when using stools.

WHAT TEACHERS WANT

(Concluded from Page 76)

to the side of the window for holding the curtain down close to the window, and keeping out all side light. One teacher criticized the arrangement of the electric-light switches in the room, as not suited for lighting on dark days. The front and back groups of lights were on separate switches, but the teacher suggested that, instead, the row of lights on the darker side of the room should be on one switch. On the dull days only those seats on the darker sides really needed the extra light. Top light was reported as desirable for artwork—attic rooms often being used, though not always allowed by the state because of danger from fire. A gymnasium teacher favored extra skylights for the gymnasium.

Heating and Ventilation. Steam heating seemed to be the most generally used type, and was favored on the whole. Special week-end heat for plants was a need expressed by one botany teacher.

Mechanical ventilation as compared to window ventilation or the use of window boards, received a majority vote. Some teachers reserved the right to use the windows in addition to the mechanical ventilation if necessary, especially on the warm days when the system would not be operating in full force.

Extra Suggestions. Different departments had many extra departmental needs and practical suggestions. The library emphasized the glass incased conference rooms just off to the side, for committee work under the supervision of the librarian. A baby piano and a Victrola, both on rollers, were suggestions for the gymnasium. In one school there are front steps leading up to the gymnasium stage. These steps are reversible and can be shoved around under the stage out of the way when a performance is being given, the back of the steps fitting in as a part of the paneling of the base of the platform. Screens for the cafeteria were suggested to shut off a section for teachers or any special private group.

Artistic Touches Which Come Later

There were many suggested artistic touches to add to the attractiveness of the buildings. In several schools there were built-in seats in the main hall, places where the teachers could be sitting informally without giving the impression they are there for hall duty. One or two schools seemed to take a special pride in the fine large artistic pictures in the halls and assembly room. In one older building the art class had decorated its chairs and tables in soft attractive colors. On the walls they had a great white frieze of paintings, all different styles of costumes from earliest periods down to the present, a project which had been carried out by one of the classes. The art department also recommended extra screens, a raised platform for models, a large table in the room for general supplies with a paper cutter attached and a sink with water connection. The latter they would have screened off if possible, or off in an alcove as it is almost impossible to keep the sink looking neat, especially during class periods when in such constant use. Window ledges for plants were recommended by some.

Other suggestions given were a paper chute, tall waste-paper containers, pencil sharpeners for each room, a beveled-edge plate-glass top on the desk in the principal's office to keep the school program and important schedules at hand, and the Bradley wash fountain with its large terazzo basin where at lunch time a whole group of boys could wash at one time.

Some Criticisms

Several criticisms were made as to unsuitable locations of special rooms. The school clinic in one school was up on the second floor, where it would have been better located near the main office. In another case the mechanical-drawing room might have been nearer the shops, and the office of the school paper closer to the printing department.

Departmental offices were special features noted by the teachers of one building. Almost every department had a small office room where the head of the department had his desk, and where the teachers or the pupils could come for consultation and help.

It would seem from all these suggestions that teacher opinion is worthy of being given a very important place in the planning of school buildings, especially the opinion of those who have had training and experience as to what type of room and equipment best fits their departmental needs. If the building is to be adapted to the schoolwork, anticipating the growing needs of the curriculum, the experienced teachers should be the ones best fitted to know of these needs, and will have valuable suggestions for the principal and architect. It only emphasizes the great need for the cooperation of administrators and teachers with the architects in the planning of school-building programs and projects.

THE CONTROL OF LIGHT

(Continued from Page 77)

and the floors and desk tops. The ceiling should, therefore, be painted a light color such as white or light cream so that it will reflect at least 65 per cent of its light. The walls should be painted some such color as grayish green, light buff, dark cream, or light warm gray so that they will reflect from 40 to 50 per cent of their light. The floors and desk tops should have some dull finish so that they will not reflect more than 25 per cent of their light. The board can prevent such harmful effects as light paint on

Sheldon Tables with Efficiency Chairs Make Quiet Orderly Laboratories

THE attached chair for use with Sheldon science and home economics table originated in the Research Laboratory of E. H. Sheldon & Company.

The original is known as THE SHELDON EFFICIENCY CHAIR. It can be used *only* with Sheldon chemistry, physics, biology, art, and sewing tables—tables constructed especially to support the SHELDON EFFICIENCY CHAIR and tested to support the chair *when eight hundred pounds of pig lead are placed upon it.* Because we build *both the table and the chairs* we stand in back of *both* with a *guarantee* of satisfaction.

SHELDON EFFICIENCY CHAIRS promote concentration and conserve nervous energy; they are flexible, permitting students to assume the most comfortable positions and to arise and sit down quickly and noiselessly; they swing around the end of the table out of the way in an instant; a special device makes it *impossible for the chairs to strike or mar the table at any point.*

By using SHELDON TABLES with SHELDON EFFICIENCY CHAIRS rooms used for science, sewing or art may also be used as class rooms or vice versa.

Showing three men with a total weight of 450 pounds standing on a SHELDON Efficiency Chair without injury to chair, table or casting.

Write for literature explaining how SHELDON TABLES with SHELDON EFFICIENCY CHAIRS will enable you to save floor space and increase educational efficiency in your new building.

E. H. SHELDON & COMPANY

Laboratory, Home Economics, and Vocational Furniture

MUSKEGON, MICHIGAN

lower walls, sharp contrasts, and reception of too much light from below the normal line of vision.

It should also think seriously as to the number and placement of electric light fixtures in each room.

The Teachers' Duty

The teacher has many and specific duties.

1. She should keep the direct rays of the sun from striking the pupils during school hours. The direct rays of the sun always produce a glare. The reflection of these rays is excessive for the eye. The worst thing that may happen in the failure to control light is to let the sun shine on the work places in the classroom or in the faces of the pupils.

2. She should regulate the window shades. She should see that the light comes in from the top rather than from the bottom of the window. The best light comes in from the top; it is this light which reaches the far side of the room. She should also see that light is as evenly diffused as is practicable. If there is only one roller, it should be placed at the bottom of the window; if there are two, one should be placed at the bottom and one at the middle of the window. An adjustable shade is very desirable.

3. She should seat pupils as advantageously as possible. Those with eye deficiencies should have the best light conditions which can be found in the classroom.

4. She should be conversant with the needs of each child.

5. She should make recommendations to her supervisor and in turn to the board of education in case any corrective measures, beyond her control, should be applied. These recommendations may include the provision of reflectors, the reflection of light, the placement of electric lamps, the type of window shades, and the number of electric-light units.

In tactful and wise leadership of the board of education and the instructor, the superintendent has a sphere of service of no small importance, because all are engaged in the conservation of precious human potentialities.

THE HARRISBURG HIGH SCHOOLS

(Continued from Page 86)

had familiarized himself with the schoolhouse needs of Harrisburg, and was able to devise, suggest, and recommend.

Thus, out of what was an expression of democratic discussion and contention came calm and reason, and the plans were formulated with exceptional thought and care and executed in an efficient manner.

THE HARRIS HIGH SCHOOL, HARRISBURG, PENNSYLVANIA

The John Harris High School at Harrisburg, Pa., is located in the extreme eastern part of the city, on the crest of a gently sloping tract of 35½ acres. One section of the site has been graded for use as a school and community stadium where athletic activities will be concentrated. The building was erected during the year 1925-26 and was occupied in September, 1926.

The design of the building is an adaptation of Greek architecture. A feature is a spacious porch on the front entrance and a smaller porch at the Hale Street entrance. The cornices are of brass and copper, with aluminum crestings topping the cornices.

The building is of fireproof construction and is constructed of a mottled shade of gray brick, with cast-stone trimming. The floors are of terrazzo, in rows of black and white squares, with brass expansion strips. The side walls of the corridors are finished in rough plaster, with scored joints in imitation of ashlar stonework.

The foyer has a two-tone terrazzo floor and base, plastered stone wainscot, and doors finished in birch. Near the foyer is a trophy room which has a stone fireplace.

The stairways leading to the main stair hall have marble risers and treads, with cast-bronze stair rail. The corridors, which are 600 ft. long are finished with a two-toned terrazzo floor and base, with plastered stone wainscot and plaster ornament.

The building conforms to the peculiar contour of the site, the shops and gymnasium units being located at lower levels than the main building. The gymnasium is reached by means of ramps on either side of the auditorium. There is a drop of 8 feet on each side, which is utilized for the amphitheater arrangement of the auditorium.

The first floor of the main building consists of 16 classrooms, 3 artrooms, 7 commercial rooms, 6 laboratories, a mechanical-drawing room, a music department, 2 gymnasiums, a home-economics department, administrative offices, stockrooms and restrooms. The 2 gymnasiums, for boys and girls respectively, are provided with locker and shower rooms. Each room has a 2½-in. hardwood floor. The walls are finished with smooth cement plaster and the ceiling is constructed of closed steel trusses with a 2½ wood ceiling. Each room is 60 by 85 ft. in size.

The cafeteria is housed in a separate building which is connected with the main building and seats 600 persons at one time. The floor is of two-toned terrazzo squares, with plaster walls and piers, and steel and wood ceiling. Six shop buildings are located on a slightly lower level and are connected with the main building near the entrance.

The auditorium seats 1,500 persons on the main floor and has 300 additional seats on the stage. While there is no gallery at the present

(Continued on Page 168)

101 YEARS OF MANUFACTURING EXPERIENCE

This is the new H-W Sanitary Pedestal Desk Set which is causing favorable comment among educators.

The H-W line of School Seats is most complete and contains many desirable models.

PROMOTES SANITATION AND PROTECTS HEALTH

THIS desk, the latest development of our Research Laboratory, simplifies sweeping, promotes sanitation, and thereby protects the health of pupils. With each unit supported by a single base, a much greater floor area is noticeable to the pupil. As a result, this desk deters those minded to litter the floor and, consequently, encourages classroom cleanliness. It is sturdy yet graceful, absolutely rigid, and is made without a single dust-catching crevice or corner. This modern desk, made in both adjustable and stationary types, will interest everyone concerned with practical seating.

Our seating experts will be glad to tell you more about this Sanitary Pedestal Desk Set and to suggest helpful seating plans. The nearest H-W warehouse will send a man to you without cost or obligation.

The advantages of this desk and many other school units are described in our new School Furniture Catalogue. Write for a copy.

Heywood-Wakefield

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The child's friend at home is no stranger in the school

CRAYOLA Crayons and other Gold Medal School Products derive a good part of their popularity through their extensive use in millions of homes.

Progressive School Boards sense the fact that a playroom favorite makes an ideal classroom necessity, by easing the teacher's labors through quickening the pupil's attention.

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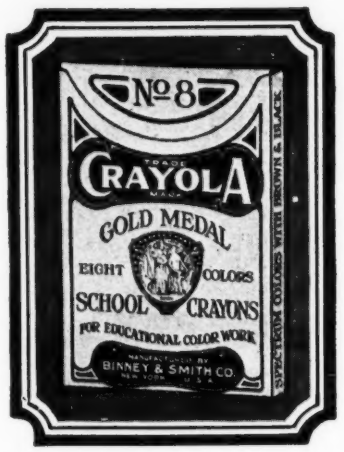

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AN-DU-SEPTIC Dustless Crayon
ATLANTIC White Chalk Crayon
White and Colored Blackboard Chalk
Lecturers' Colored Chalk

(Continued from Page 166)

time, provision has been made for one to be added in the future. The room is arranged in a fan shape, to give each seat a clear vision of the stage. The room has plaster-stone walls, stucco trim, cement floor, steel trusses and wood ceiling, and is adequate for all ordinary school entertainments and theatricals.

The second floor consists of 14 classrooms, a library, a study room, and restrooms. The library which is 93½ by 24½ ft. is finished in mahogany. The room has a two-tone cork floor, plaster ceiling, and ornaments. There is also a study hall seating 100 pupils. A feature of the home-economics department is the tile fireplace in the sewing room.

The music department seats 200 pupils and is provided with a beamed-ceiling amphitheater. The artrooms are arranged for northern exposure with typical studio effect. The ceilings have a height of 30 ft. each.

The building is heated by means of a steam system, with direct radiation in all rooms and unit ventilation in all the classrooms, etc., except the auditorium and gymnasium. Each classroom is provided with coatrooms in the rear where they are under the supervision of the teacher. The science room has raised seating and individual equipment. The floor is of hardwood and the walls are of plaster.

The building was erected from plans prepared by Lappley & Hornbostel, architects, of Harrisburg, with Ernest Sibley of Palisade, N. J., as consulting architect.

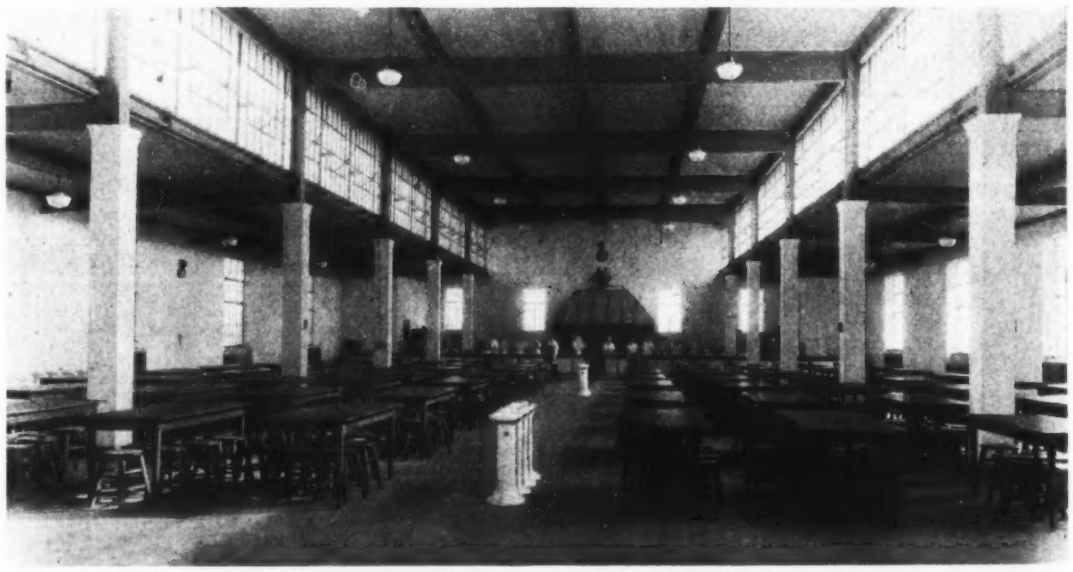
THE WILLIAM PENN HIGH SCHOOL, HARRISBURG, PA.

The William Penn High School at Harrisburg, Pa., is located in the northwestern portion of the city on a level plot of ground containing 43½ acres, eight of which are woodland and are intended to serve as a neighborhood park. Construction work has been begun on an athletic field for the northern portion of the lot, which will have space for community football and baseball fields, a quarter-mile track and 220-yd. straightaway, and a grandstand seating 3,000 persons.

The original plans provided for ten shops which were built in advance of the main building. These shops contemplated a capacity of 3,000 pupils for the building. A change in the policy reduced the capacity to 1,500, and the use of several of the shop units was diverted to cafeterias, home-economics rooms, and a model three-room apartment.

The building is three stories in height and is designed in a classic style of architecture, with a Doric colonnade and classic entablature as the principal feature of the main façade. The column motif is carried through the attic story and in the wings at the north and south ends of the building. The exterior of the building is a combination of gray brick and light cast stone. The exterior treatment has been carried out with considerable restraint, to avoid expensive detail and to produce a monumental and impressive effect. The foundation walls are of concrete, with superstructural walls of brick, and floors and roofs of reinforced concrete slabs. The corridor floors are covered with battleship linoleum cemented to the structural concrete slabs, which produces a durable and soundproof floor. In the lobby in front of the auditorium, gray Tennessee marble has been used for flooring. The use of pilasters with vaulted ceiling effect has been effectively used. The building is approved by the fire underwriters as first-class fire risk. The interior is designed with the same substantial architectural ideas in mind, and the large auditorium with its simple deco-

(Concluded on Page 171)



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Lappley & Hornbostel, Architects, Harrisburg, Pa.

Another Victory!

22nd Annual World's Typewriting Championship

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133 WORDS a minute for one hour! 41,232 strokes or more than 11 strokes per second! A phenomenal performance of speed and accuracy by the World's Champion Typist in establishing a NEW WORLD'S RECORD on the Underwood at the 22nd Annual Typewriting Contest, Carnegie Hall, New York City.

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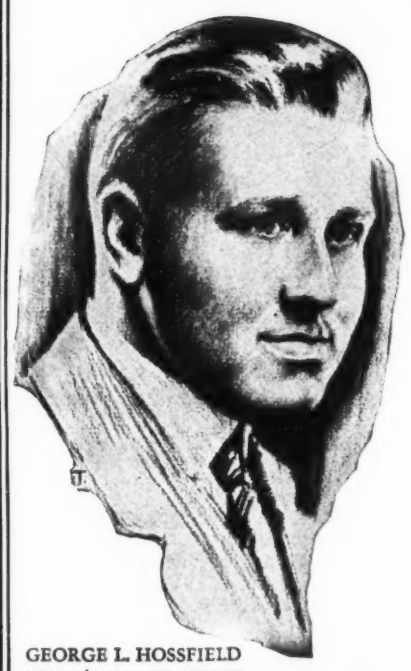
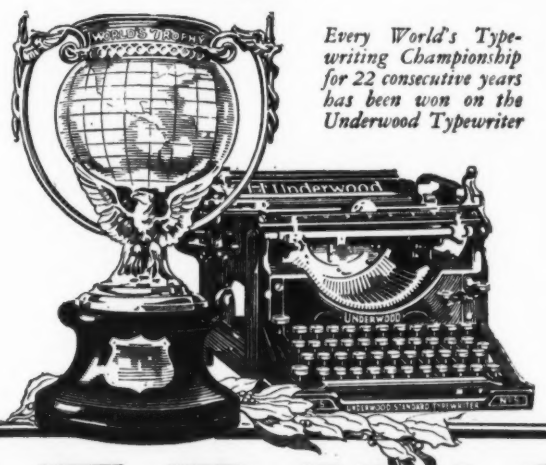
won by Chester Soucek, Coraopolis High School, Coraopolis, Pennsylvania, at 81 words per minute. This trophy for speed and accuracy in typewriting was won in competition with 55 other contestants representing all sections of the United States and Canada.

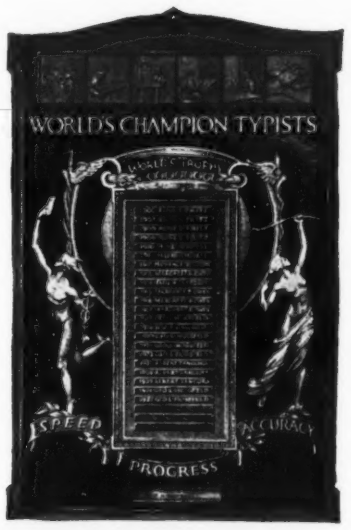
A complete copy of the Official Records will be sent free upon request. Underwood Typewriter Co., 30 Vesey Street, New York City.



GEORGE L. HOSSFIELD
WORLD'S CHAMPION TYPIST



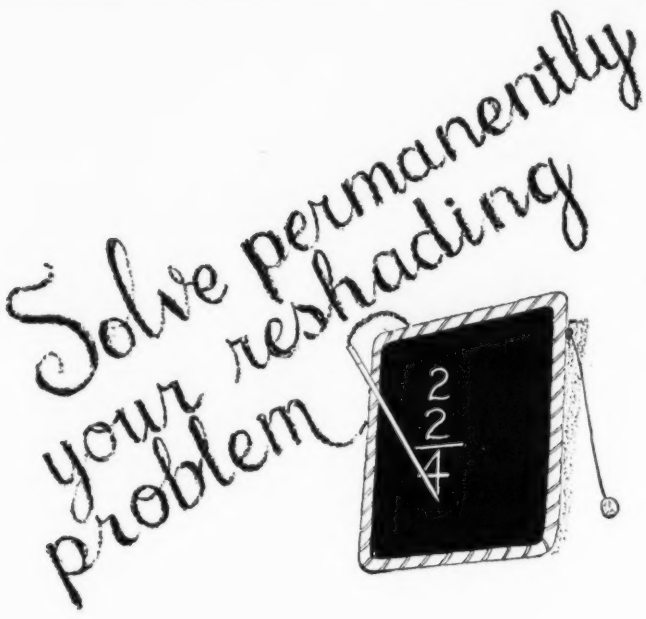
Every World's Typewriting Championship for 22 consecutive years has been won on the Underwood Typewriter



New World's Typewriting Championship Trophy

UNDERWOOD

The Machine of Champions



YEAR after year, it comes up again. This problem of reshading—of replacing shade rollers that fail to withstand the exacting needs of schoolroom use.

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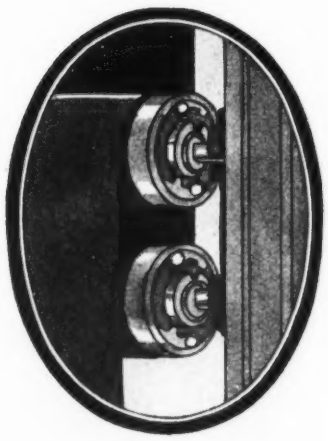

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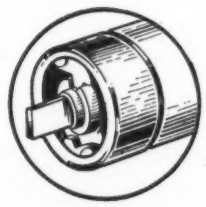

A shade is only as good as its roller

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The Dayton Safety Ladder, made of steel-braced aeroplane spruce, does not slip, slide or wobble, gives long years of accident and cost reducing service. Sizes 3 to 16 feet, with folding auxiliary step for extra height when needed, as shown above. Moderately priced.

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(Patented)

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Picture a blackboard that works like a giant book—four "leaves" of eight "pages"—giving the teacher ***eight individual blackboards*** on which to write exercises and test questions. ***Eighty-four square feet of blackboard space,*** convenient to handle and display to the class! This efficient, swinging blackboard is saving time and improving teaching conditions in thousands of schools throughout the nation.

With The Alternator, the teacher may prepare her blackboard lessons in advance and thus save time during the school period. The lessons and tests need not be exposed to the scholars until the proper time. To swing the boards in any position, the teacher merely gives a gentle push. The boards move freely, and stand in place at any angle where stopped.

The Alternator saves time, enabling the teacher to keep lessons from day to day. It is easy to handle, as there is nothing to lift. And there is nothing to get out of order, for the patented swinging device always works perfectly! The cost is amazingly low. Write for Catalog T-2.

K-M SUPPLY CO., 123 West Eighth St. **Kansas City, Mo.**

(Concluded from Page 168)

rative scheme may be classed among the most dignified of the schools halls of the country.

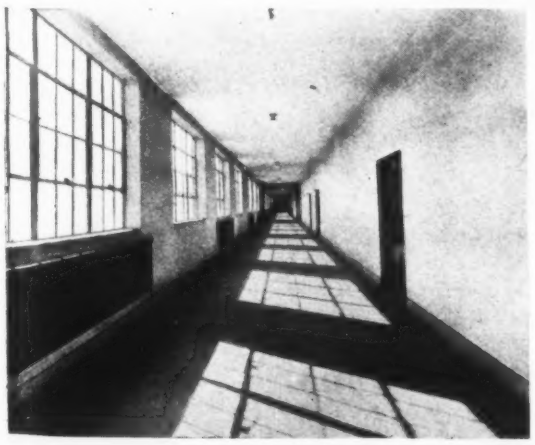
The first floor of the building contains 15 classrooms, 3 artrooms, science laboratories, 2 gymnasiums, 6 shops, 2 cafeterias, 2 home-economics rooms, the auditorium, administrative offices, and restrooms. The auditorium has beautiful proportions and seats 1,500 persons, with an additional capacity of 300 on the stage. The acoustics of the room are considered very satisfactory, while the restrained use of ornament gives an impressive effect. The boys' gymnasium is 60 by 100 ft. and the girls' gymnasium is 60 by 85 ft., and both have been provided with adequate dressing rooms and showers. A large room is provided for the use of visiting athletic teams.

The second floor provides space for 19 classrooms, 6 commercial rooms, 2 study halls, a library, the auditorium balcony, restrooms, and several supplementary rooms. The library is located in the front of the building and seats 120. The study rooms on the north and south wings seat 100 each. The library has a beamed plaster ceiling, with pilasters, and the woodwork and bookcases are in mahogany.

The third floor is devoted largely to music.

Direct steam heat and ventilation have been used throughout the building, with the exception of the auditorium and gymnasiums. All classrooms have been equipped with Miller wardrobes located in the rear of the rooms.

The building was erected from plans prepared by Mr. C. Howard Lloyd, architect, of Harrisburg, Pa., with the firm of Perkins, Hamilton & Fellows of Chicago, as consulting architects. The building was occupied in September, 1926, and was dedicated the following November.



NORTH CORRIDOR,
WILLIAM PENN HIGH SCHOOL, HARRISBURG, PA.

LIBRARY,
JOHN HARRIS HIGH SCHOOL, HARRISBURG, PA.
Lappley & Hornbostel, Architects, Harrisburg, Pa.

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The superior surface and durability of Beaver Blackboard do not conclude its advantages. The first cost, shipping expense, and application cost are surprisingly low. It comes in large, sturdy panels 3, 3½, and 4 feet wide and from 6 to 16 feet long—larger and lighter than slate or heavy composition boards. One man can quickly apply it with a worth while saving in time and labor—in new work or *right over the* old blackboard, brick, plaster, or wood.

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BEAVER FIBRE BLACKBOARD

TWO COLORS ~ BLACK AND GREEN

FACTORS DETERMINING THE SIZE OF A HIGH-SCHOOL BUILDING

(Continued from Page 47)

the study in order to be in a position to contribute a reasoned opinion upon the advantageous side of education units in the public-school system."

Respectfully submitted,

D. C. Allison	Joseph C. Llewellyn
James O. Betelle	William O. Ludlow
J. J. Donovan	William H. Gompert
Sidney F. Heckert	W. G. Malcomson
J. C. Hopkins	W. R. McCornack
Clare Hosmer	F. A. Naramore
William B. Ittner	John Irwin Bright
Ellis F. Lawrence	Chairman.

New York Findings

A personal letter from Mr. Eugene A. Nifenecker, director of reference, research, and statistics for the New York City schools, dated August 16, 1927, on the size of school buildings and scholarship, reads as follows: "We have no definite information on how far the size of a high school influences the scholarship of pupils. One of our district superintendents in charge of high schools claims that there is no correlation between the size of the schools and the work of the pupils. As a matter of record, he says that the larger high schools have shown better results than the smaller schools, but that is partly due to the racial element entering high schools in certain sections of the city rather than to size. In our city, the smaller high schools are in boroughs in which there is a smaller percentage of Jewish children."

Mr. Newton H. Hegel, director of attendance and administrative research, Minneapolis, Minnesota, makes the following statements: "The decision to limit senior-high-school enrollment per building to 2000 is based upon the opinion of the administration: (1) That there is no added economy in larger buildings; (2) that there is distinct loss of contact between principal and pupil in larger buildings; (3) that our experience with situations where enrollment ran over 2000 was unfavorable as far as moral standards and moral controls were concerned.

"Some attempt was made to evaluate the situation in regard to points two and three statistically, but this attempt has yielded nothing conclusive."

Some opinions on the optimum size of high schools as quoted herein from superintendents, members of the board of education, principals, and teachers, in protesting the erection of a 5000-capacity high school building in New York City. The opinions were collected by a citizens' committee after a period of investigation and submitted to the mayor for his guidance in order that he might be persuaded to stop the erection of the proposed building. The data here given are taken from "School Building Problems," by Strayer and Englehardt, and given in condensed form.

Opinions from Principals and Teachers

The opinions come only from those people who have been working in very large buildings and who are, therefore, in a position to give conditions as they exist and causes for the conditions.

"Conditions in a school are affected not only by the size of the school itself; and the school environment of teachers and pupils affect the amount and quality of work done and the health of all individuals confined in school buildings during the greater part of the day."

One principal said, "The business of the school is to individualize the child. Schools are fast becoming a factory. A child is filled and turned out as if a sack of corn. I favor smaller schools, fewer swimming pools, and a gymnasium without a megaphone."

Another principal said, "The vastness of our new building is a drain on my nervous energy. I also believe it to be a physical strain on the pupils."

A teacher in one of the large schools said, "I disapprove of these tremendous buildings because I think they dwarf and automatize the individual teacher and pupil too much. One becomes a tiny cog in a vast machine. Wholesale mass teaching leads to routine; mechanical, inartistic procedure on the part of all."

Another teacher said, "Huge schools defeat the essential aims of education. Principals and teachers lose their identity."

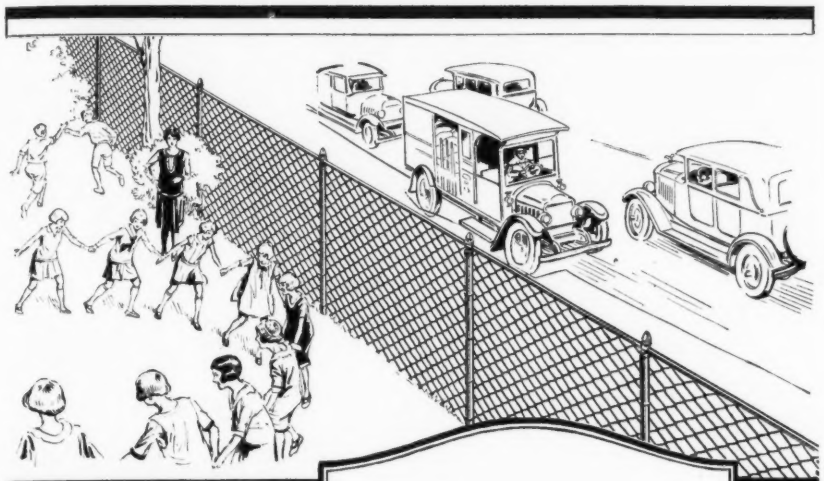
The opinions of other teachers were as follows: "Increase in size cannot be met by increase in the number of teachers. The strain in large schools is in geometric progression." "Relations between the teachers and the administrative staff and among teachers themselves, is far less intimate and appreciative than it would be in a small school." "Stealing is much more prevalent and much more difficult to correct." "Girls apparently feel less responsibility when they lose their individuality." One principal gave up. He found the great school "A factory and soulless."

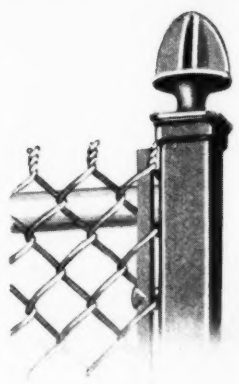
Conclusions

The following factors, as schools are now conducted, seem to have a bearing on what the size of a high school should be:

1. Personal contact of pupils with the principal.
2. Administration of the school.
3. Transportation facilities.
4. Personal observation of the pupil by the principal.
5. Morality.
6. Time lost in class shifts.
7. Walking distances.

(Concluded on Page 174)





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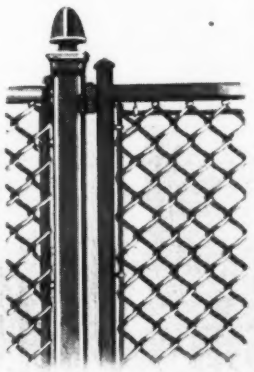

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A sturdy Anchor Playground fence will keep the youngsters "within bounds." It will relieve the teachers of "guard duty"—permit them to give uninterrupted attention to play instruction.

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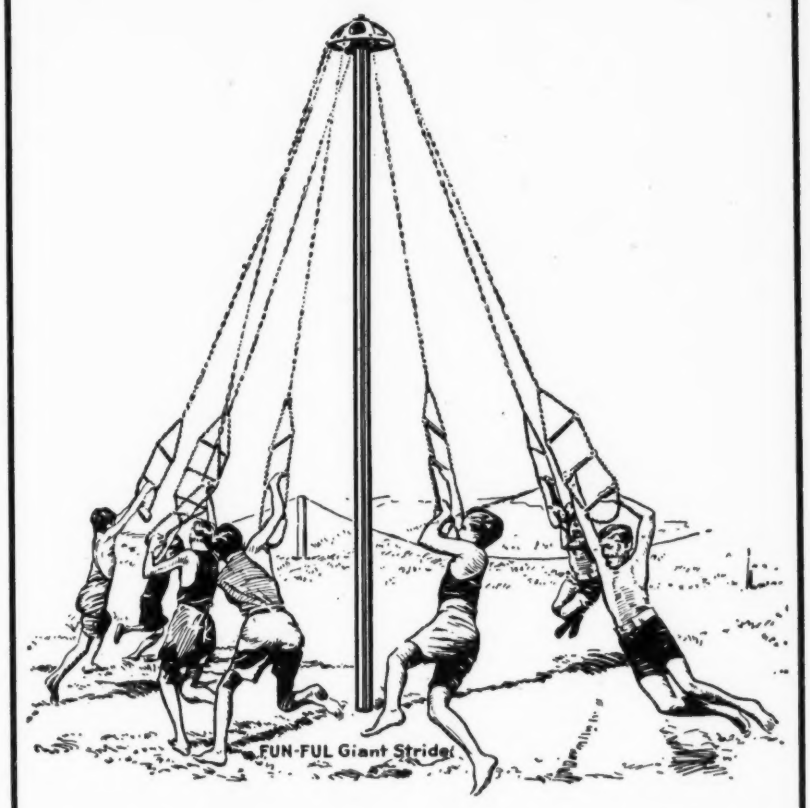

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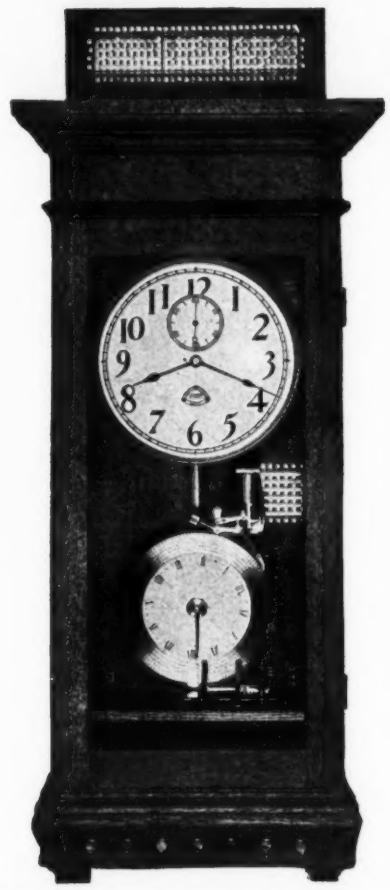

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WAYNESBORO, PENNA.

(Concluded from Page 172)

8. Loss of individuality of pupils and teachers.
9. Curriculum to be administered.
10. Health.
11. Quality of work.
12. Distribution of population.
13. Mass education lowers per-capita expense.
14. Traffic congestions in connection with the assembling or dispersing of especially large groups of young people.
15. The city plan.
16. Teaching force.

In order to determine whether some of the above statements are real factors in determining the size of a high school will require a great deal of investigation covering a long period of time. Schools of different sizes will have to be compared in every conceivable way. The educational capacities, physical conditions, and moral qualities of the children will have to be known when they enter the schools. A careful check made during their progress through the school, and then a final check made on the results when they are graduated. It would also be necessary to compare the costs of the physical plants, and the equipment used in turning out the product. Then too, the teaching staff should be considered and weighed with the utmost care. The staff should be compared as to quality, expense, and the effect upon the staff, who after all are the greatest factors in producing the educational product turned out by the public schools.

After my brief study of the problem, I am of the opinion that under present methods of administration, the size of high schools ought to be limited to 1200 or 1500 students. I feel, however, that as soon as we can set up better machinery for the handling of the larger groups that there need be no limit set. Smaller units can be set up within the larger units and so administered that the same results can be obtained as is now claimed for the smaller group. The problem of the large high school is a comparatively new thing. Men can and must be trained to handle the new situation confronting the larger cities.

While there are no data to support the notions or opinions of the various superintendents and school officials that the size of high schools should be around 1500, it is quite evident that experiences and observations must have embodied situations and conditions which led them to hold or have these opinions. The next step will be to gather definite data which will support the opinions.

THE WILSON JUNIOR HIGH SCHOOL

(Concluded from Page 71)

in each, as outlined by Superintendent Diehl in a special report to the board of education. The plan of the building as developed by the architect, W. W. Meyers, is particularly favorable to the topography of the site, and has been worked out with a view to making the entire building easily and economically administered.

THEN AND NOW IN SCHOOL FINANCE

(Concluded from Page 101)

as regards school administration. The sole concern of many of the old-type officials was reelection to office, and every transaction was considered first from the point of vote getting. Other conditions made the purchase of municipal securities expensive to the banker. A representative had to be on the ground several days in advance of the meeting date, as it was impossible to secure reliable financial data by letter or wire; and even where information was available, the number of issues awarded on mailed offers was negligible. Buyers attended sales hundreds of miles distant with much duplication of effort and at much expense. In those days municipal officers expected to be entertained and wined, and these items were considered necessary expense of doing business.

Today the situation is vastly different. In the east, west, and north, the old-time traveling "bond buyer" is practically extinct. A few continue in the less progressive sections of the south, but the number is rapidly dwindling. It is today possible for a banking house to mail a proposal across the continent and to be more than reasonably certain of its success, if it is the highest and best offer. Many states have passed laws compelling municipal bodies to advertise, for varying periods, all sales of their securities. The average official is always willing to furnish complete and reliable data, and a much greater effort is being made by all officials to prepare bond issues in a form most attractive to investors. The former mutual distrust between investment bankers and public officials is being or has been replaced by mutual respect, to the advantage of both. Bankers advertise the securities which they offer for sale and such public offering of bonds recently purchased shows the profit to be more than fair for the service rendered. It is another example of more satisfactory business relations resultant from mutual understanding of problems involved and of mutual endeavor to correct bad business practices.

—Supt. R. E. Tope of Grand Junction, Colo., has been reelected for a new term, which will extend his service tenure to twenty years.

—Mr. Holly W. Maxson, for fifteen years supervising principal of schools at West New York, N. J., died at a local hospital. Mr. Maxson was a graduate of the Adams Collegiate Institute, Alfred University, Albany Normal College, and Columbia University. He had completed several years as a teacher and principal in New York and Rhode Island before coming to New Jersey to take up supervisory work.

Special— For School Use

In this age of specialization you should know your market, to get the most cleaning for your dollar.

The appliance that is too big or too small —too limited or too unwieldy—makes a big leak in your budget.

National Super Service Cleaners are entitled to your consideration because they were designed by competent specialists to solve school cleaning problems.

If they can give you the biggest return for your cleaning dollars you will not hesitate to scrap less efficient methods. That has always been good American doctrine.

You cannot judge these claims until you give the **National Super Service Cleaner** a thorough try-out. Let us make that easy for you.

What many others are doing with it is, of course, important evidence. We have a lot of that. But an unbiased, unhurried test by your own school manager or janitor, under the most exacting service conditions, is what you should have.

Write today, giving a brief description of the school building you have in mind and the number of its rooms.

THE NATIONAL SUPER SERVICE CO.

820 Lafayette Street **Toledo, Ohio.**

Start the New Year with Better, More Economical Towel Service!

Adopt Dubltowls immediately—they will keep you within this year's budget. Obtain for your school the great savings that were enjoyed by hundreds of schools during the past year.

Children use two or three sheets and sometimes more of ordinary toweling to dry two little hands. Dubltowls stop this waste, for children soon learn that one Dubltowl dries hands and face quickly and efficiently. Fewer towels are used, washroom costs are greatly decreased.

Dubltowls have unusual strength and a soft, pleasing texture. They are readily accepted by school officials and teachers. Dispensed from neat Dubltowl cabinet or your present standard size equipment. Size of sheet 10¾ x 10 inches. 150 Dubltowls (300 sheets) to the package—25 packages per carton.

BAY WEST DUBLTOWLS

"ONE DUBLTOWL WIPES DRY-TRY IT"

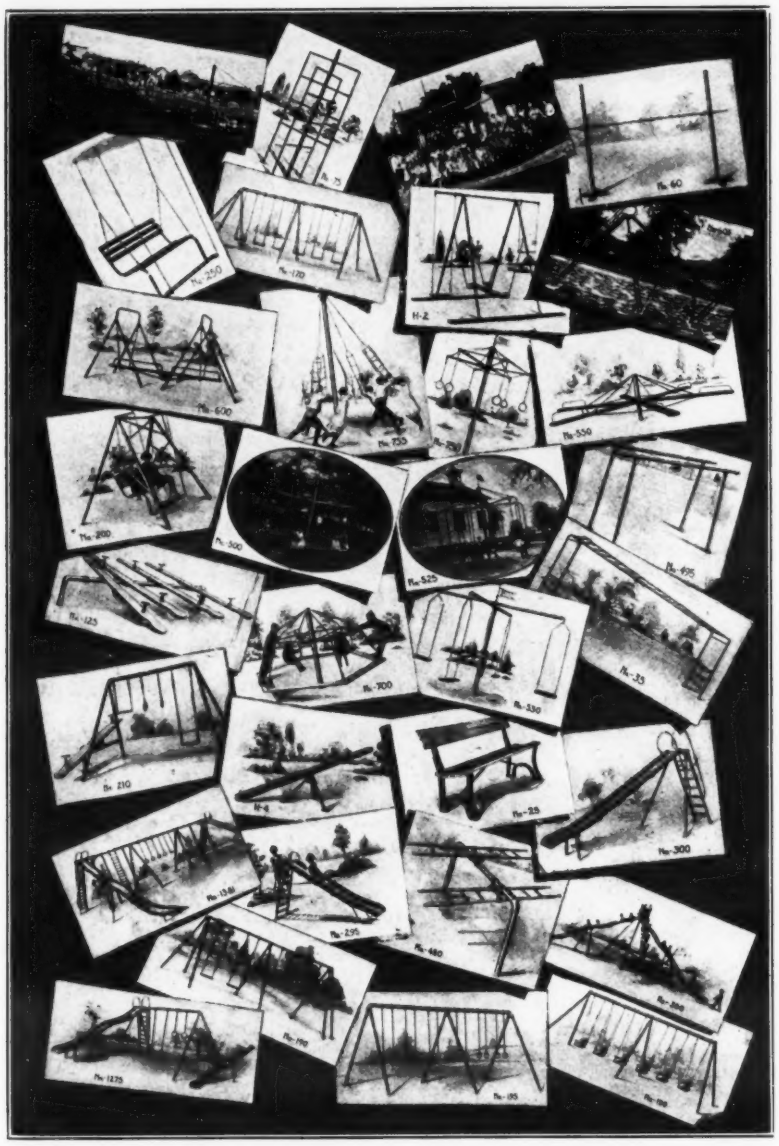
BAY WEST PAPER CO.,
Green Bay, Wis.

Yes, send me without obligation or charge a dispensing cabinet and a few packages of Dubltowls.
(Carrying charges prepaid.)

FREE TRIAL OFFER

Name.....
School.....
Address.....

MITCHELL
"Betterbilt"
Playground Apparatus

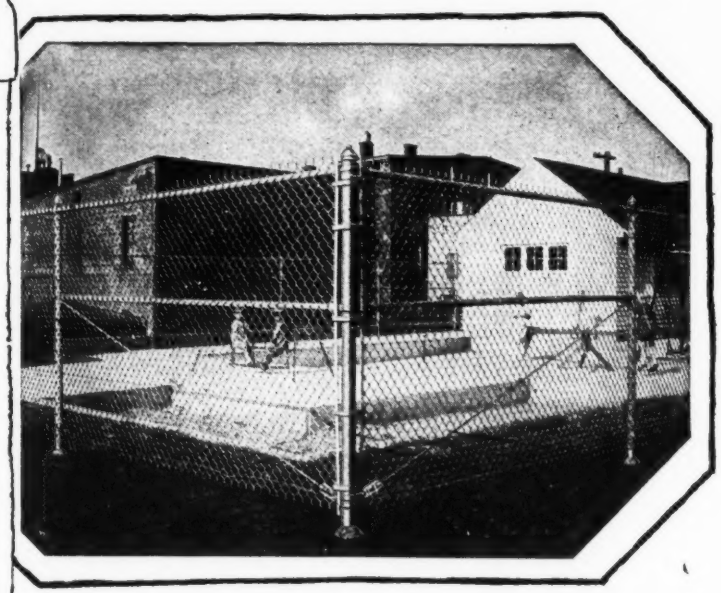


The Mitchell Merry-Whirl No. 500 will accommodate as many as fifty children at one time and it operates so easily on its roller and ball bearings that one little tot of five or six can manipulate it alone without excessive exertion. Its ample capacity and variety of motion—swinging in and out from the mast as well as around it — adapts it to places where limited space precludes the use of more than one Playground attraction. A plot 30 ft. square is room enough for the Mitchell Merry-Whirl.

Send for this Free Book on "BETTERBILT" PLAYGROUND APPARATUS

MITCHELL
MANUFACTURING COMPANY
1802 Forest Home Avenue, Milwaukee, Wis.

Stewart FENCES



A Suitable Style
For Every School Purpose

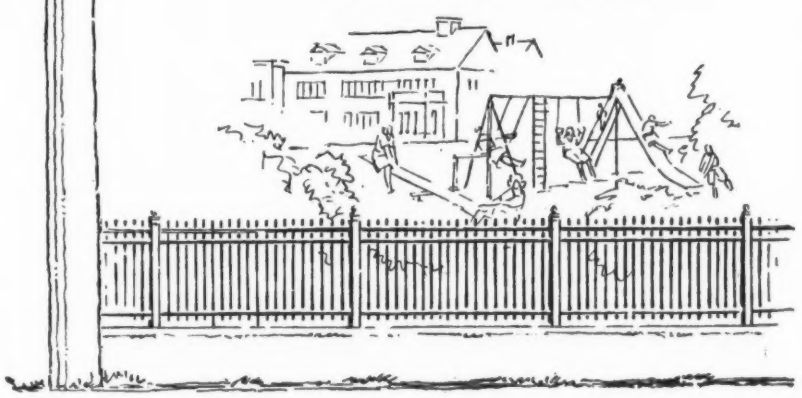
Nowhere else can you find the range and variety of fence styles and types which the Stewart Fence Line offers you. There is not a school requirement which cannot be met completely, promptly, economically, from the Stewart line.

And — added to the intrinsic values of good taste, sound design, honest construction and high-class material—are Stewart's 40 years of fence building experience. In both Wrought Iron and Chain Link Fencing, Stewart quality and service and experience assure satisfaction.

Let us send the Catalog. Or, shall one of our fence specialists call?

The Stewart Iron Works Co., Inc.
420 Stewart Block Cincinnati, Ohio
Representatives in all Principal Cities

IRON FENCE
ENTRANCE GATES
CHAIN LINK FENCES
WINDOW GUARDS



FORMART
PREPARED CLAY MODELING

FORMART is a pure modeling clay, clean and sanitary. It is reasonable in cost, which economically permits each pupil to be given his or her individual piece of clay. Like the roller towel and tin cup, the practice of using non-drying clay over and over again in a classroom is losing favor.

FORMART is the new name given to an old product —DFC Modeling Clay—that has been used for years by sculptors, art studios, and educational institutions, both in the kindergarten and upper classrooms. **FORMART** is a true modeling clay, with excellent working and drying qualities. It can be tinted, or better, fired and preserved indefinitely.

FORMART Prepared Modeling Clay is furnished in: 25 pound, 100 pound, 300 pound, and 500 pound Metal Drums. Write for Bulletin Number 340.

The Denver Fire Clay Company

Denver DFC *Colorado*

SALT LAKE CITY *EL PASO* *NEW YORK CITY*

KERAMIC KILNS
also a DFC product, are recommended to preserve the work of the student. Write for Bulletin No. 360.

THE SUPERINTENDENT OF SCHOOLS AND THE NEW SCHOOL BUILDING

(Concluded from Page 40)

will cost a great deal more than would be the case if a definite appropriation were made, within which the board must hold itself. Such a suspicion is sometimes justified, but in the great majority of cases it would be the better method of handling the matter, as the building could be designed and then the price determined after bids were received, and the community given the building of the type and size needed.

Asking for Adequate Funds

Preliminary estimates are at best only a guess, and oftentimes lead to disappointment and embarrassment when the final estimates are received. It requires considerable backbone on the part of both the superintendent and the architect to stand out for adequate funds needed to erect a building. Without preliminary plans it is almost a hopeless task for the superintendent, as he has nothing to show his board of education as to what is in his mind, and the board members feel that their guess as to cost is as good as his, and of course their guess is lower. With preliminary plans in hand, the superintendent's position is very much stronger, as he is able to show definitely on paper, a building with the requirements needed. With complete drawings and bona fide estimates, the position of the superintendent and school board is still stronger, because it is no longer a guess but a bona fide price from the lowest responsible bidder. If, then, the school authorities have been conservative and reasonable in their layout of the building, there is nothing for the appropriating authorities to do but grant their request for the money.

In the early part of this article it was pointed out that the superintendent of schools should have the quality of leadership. In fact, he should have something in addition to this quality, and that is selling ability. He should not only be able to "sell" the idea regarding the new building to the board of education, but the board will probably rely on him to a very large extent to "sell" the idea to the community. The superintendent should know what other similar communities are doing in the way of school buildings, and the size and costs of these buildings. He should be prepared to discuss this situation in public, to write articles for the local press, and in fact carry out an educational campaign, which will create not only favorable reaction from the citizens, but an actual demand for more adequate and better school accommodations, which the superintendent himself is convinced is so much needed.

Except in very small communities, the superintendent will not only cause a single building to be erected as needed, but he will also have in mind and discuss and promote a progressive building program.

The school superintendent's position, like all other positions of responsibility in this day and generation, is becoming more and more complicated. It is gratifying to realize that the superintendents are measuring up to and fulfilling with credit the many different activities and responsibilities they are called upon to assume.

HIGH QUALITY IN SMALL SCHOOLHOUSES

(Concluded from Page 44)

Plumbing, $3,812.
Electrical work, $1,653.
Total cost, $63,363.
Cost per cubic foot, $0.322.
Cost per pupil, $198.

In working out the several plans just described, it was found that the units could be made interchangeable by observing a definite scheme of construction. Therefore, the solution of the problems for other sites can be worked out with some assurance of the ultimate cost, by comparison with the units already erected. A reduced cubage volume has produced a high cost per cubic foot, but for the purposes of estimating, the cost per cubic foot is negligible. The cost per pupil is the real factor, and if this is by comparison very low, the problem of the high cost of school buildings is at least partially solved.

HOW LOS ANGELES BUILDS SCHOOLS

(Continued from Page 73)

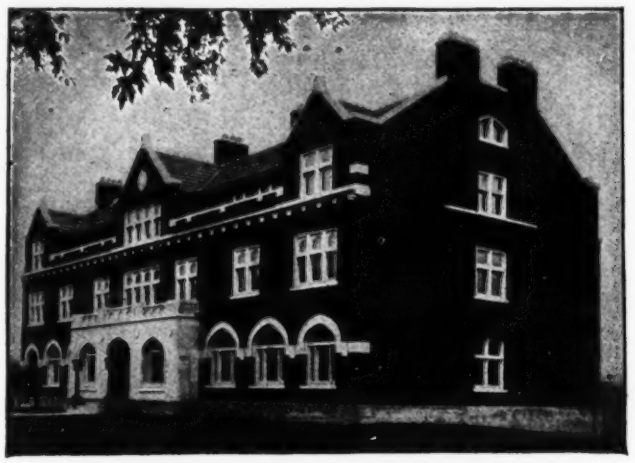
No changes in plans are permitted unless directly authorized by the school architect. Extra construction is paid for and omissions are deducted from the contract price at figures previously agreed upon with the contractor. If the article added or omitted has not been specified in the contract, the price is arrived at by conference between builder and inspector. If they cannot agree, the matter is arbitrated, the board of education and the contractor each appointing one representative and they a third. This complication is very rare.

At the end of each month, contractors are paid 75 per cent of the price of the work they have completed. Final payment is deferred until 35 days after the building is finished.

The Final Inspection

When a building is completed, it is given a final inspection by a committee consisting of the board of education, a district school superintendent, the school architect, the building and maintenance superintendents, plumbing, electrical, painting, and heating inspectors, and sometimes other interested persons.

The entire plant is gone over very carefully and any items not conforming to contract provisions are noted in a book made for this purpose. Triplicate copies of any discrepancies



Conservatory of Music, Northfield, Minn.
Sound-proofed with Cabot's Quilt.
Patton, Holmes & Flinn, Architects, Chicago.

Sound Proof Music Rooms

All school-rooms need sound-proof floors and partitions, but music rooms most of all. The above building was sound-proofed with

CABOT'S QUILT

and the directors report the usual "perfect results."

Sound-proof, Decay-proof, Vermin-proof and Fire-resistant — the only material that meets all requirements.

Samples and full details on request.

Samuel Cabot, Inc., Mfg. Chemists, Boston, Mass.
242 Madison Ave., N. Y., 24 W. Kinzie St., Chicago.

When you spend the money entrusted to your care, by your taxpayers, for Blackboards, you will be confronted by a bewildering array of claims in favor of a large variety of artificial Blackboards.

You do not want to purchase anything that needs "purchasing over" or that will pledge you to further expenditures. That is why you will want to equip your School with our

Natural Slate Blackboards

They require no upkeep, while artificial Boards must be resurfaced, repaired and replaced regularly. In comparison, the word "economy" is defined in its truest sense. It is finished with a beautiful, velvety smooth surface that does not become gray with age or use; that makes writing a pleasure and reading a relief to the eyes of the students and teachers. These are but a few of the advantages. Before you spend a dollar for Blackboards, you should read our book "How to Judge, Specify and Install Blackboards." Send for it today.

PENN'A STRUCTURAL SLATE CO., INC.
WORTH BLDG. EASTON, PA.

noted are made, one going to the school architect, another to the contractor, and the third to the chief inspector. The maintenance superintendent makes sure that everything is in good condition before the building is turned over to him.

After mistakes, if any were found, have been rectified and adjustment made with the contractor, the inspector so reports to the school architect. The committee then recommends to the business manager that the building be accepted, who in turn advises acceptance of the project by the board of education.

Choosing Building Materials

"Experience indicates that no hard-and-fast rules should be adopted regarding the type of materials used in constructing school buildings," states Mr. Record. "Los Angeles occupies an enviable position, because of her excellent rail- and water-transportation facilities, for the choice of building materials. An opportunity is afforded to employ any one of a dozen excellent materials."

Some of the newer buildings are constructed of reinforced concrete, while others equally attractive and serviceable are built of face-brick. The use of different kinds of building materials stimulates competition among dealers, which results in favorable prices. Less oak and stone are employed in construction than are used in the eastern states, where these materials are more plentiful.

Douglas fir, commercially known as Oregon pine, grows abundantly on the Pacific slope and is comparatively cheap; it is, therefore, the standard building wood. Los Angeles is the world's greatest lumber market. Cement, sand, gravel, brick, and tile also are plentiful and can be obtained at very reasonable prices. The mild, dry climate makes it possible to carry on building operations practically every day in the year, without freezing temperatures.

Los Angeles is an open-shop city, therefore, labor troubles are reduced to the minimum. Both union and non-union workers are employed on equal terms, working side by side in peace and harmony.

PUBLIC HEALTH ENGINEERS MEET

The Public Health Engineering Section of the American Public Health Association held its annual meeting on October 18, at the Hotel Gibson, Cincinnati. Mr. Thomas J. Duffield, executive secretary of the New York Commission on Ventilation, presented at this meeting a progress report for the committee on heating and ventilation.

The appointment of this committee was the result of a discussion following the refusal of the Public Health Engineering Section to indorse the action of the main body of the American Public Health Association which adopted resolutions at St. Louis. The committee now seeks light on the question of adequate schoolroom ventilation.

The report consisted mainly of extracts from letters concerning the proposed schoolroom-ventilation investigations at Rochester, N. Y., which showed that the central committee adopted a resolution of procedure in which the health of the pupils was to be the sole criterion of the benefit of the various methods of ventilation. The representative of the American Society of Heating and Ventilating Engineers apparently accepted the resolution, subject to the approval of his associates, but this approval was withheld and further progress blocked.

Prof. C. E.-A. Winslow followed Dr. Duffield with a discussion of the synthetic air chart and the attitude of engineers as to its application in the proposed investigation. Professor Winslow asserted that the synthetic air chart lacked scientific basis and that it was a device designed to prejudice in favor of mechanical ventilation. The general impression seemed to be that the engineers' attitude was prompted by commercial motives. Mr. Howard E. Sproull effectively cleared the atmosphere by a few pertinent remarks which showed a decided appreciation for the efforts of the engineers to get at the facts in a very complicated situation through their Research Laboratory. Dr. Emerson of Philadelphia, closed the discussion by stating that the committee, which guides the work of the Section, would undoubtedly caution the heating and ventilation committee.

The change in attitude warrants the hope that everyone concerned will forget feelings and proceed in an open-minded effort to get at the facts in this most important matter. Professor Winslow would be less than human if the earlier attitude of the engineers had not affected him. He has performed a task of enormous public value, which may be likened to the service that resulted in the clean-up of the packing business.

If Professor Winslow can center his attention on the value of the public service he is rendering, he will be less disturbed by the very natural resentment of the engineers who have considered their practice above reproach until it was questioned. On the other hand, the engineers need to shift their attitude enough to regard principle more and precedent less. Both parties earnestly seek the same end, viz., the method of ventilation that will best conserve health.

Men like Dr. Harry Burns, Director of Hygiene at Pittsburgh, Pa., believe that there are more children starving for want of adequate air supply than impure water or inadequate food. And all this in buildings served adequately, according to the best accepted engineering standards.

On the whole, progress is being made toward a realization that the ventilation engineer may become a most important professional adviser, when he functions adequately.

—Supt. M. C. Beck of Hankinson, N. Dak., died on November 6 after a short illness of septic poisoning.

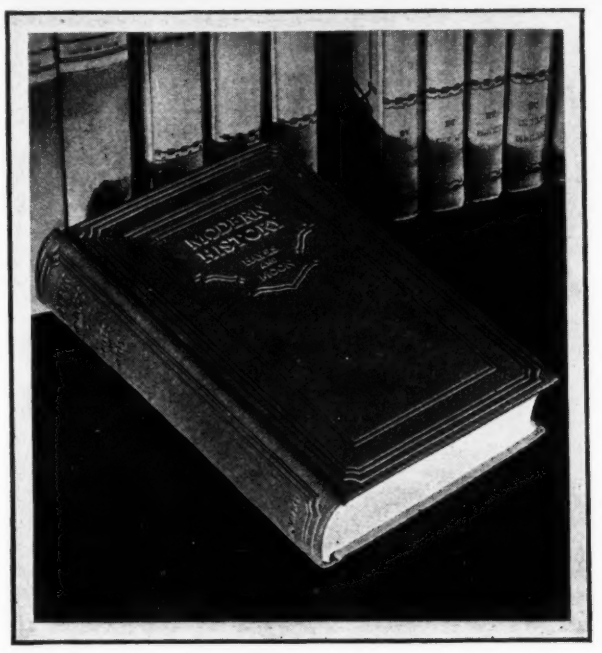
—Supt. E. C. Hartwell of Buffalo, N. Y., has been elected president of the New York Teachers' Association.

—Mr. J. L. Clifton, of the bureau of education of Ohio University, has become director of the department of education of the state of Ohio.

—The Virginia State Department of Education has established a division of research, which is in charge of Mr. M. L. Combs.

—Supt. I. E. Stutsman of Sterling, Colo., has been appointed a member of the Colorado board of examiners.

—Supt. J. F. Keating of Pueblo, Colo., has been given the doctor of education degree by the University of Colorado. Supt. Keating also holds a doctor of literature and a master of arts from the University of Denver, and a bachelor of arts from Ohio Wesleyan University.



Make the budget buy *more textbooks*

EVERY board member knows the constant drain on budget funds caused by worn-out textbooks. How can they be made to last longer—so that the budget for this vital expense item can go farther?

More and more, educators and Boards of Education are specifying textbooks covered in Fabrikoid. For Fabrikoid has extreme durability. Books bound in Fabrikoid withstand not only routine wear and tear but the hard service of students who are no respecters of their books. Fabrikoid is waterproof; rain cannot harm it. It is washable, and smudgy finger marks, ink, and other stains are quickly removed with a damp cloth. Fabrikoid is durable, cleanly and sanitary.

Because of the lower replacement costs Fabrikoid covers make textbooks less expensive. The saving Fabrikoid makes possible enables School Boards to make their textbook budgets reach farther than they ever did before.

The Educational Department cordially invites inquiries from members of Boards of Education, Principals and Teachers.

E. I. du Pont de Nemours & Co., Inc.
Fabrikoid Division Newburgh, N. Y.

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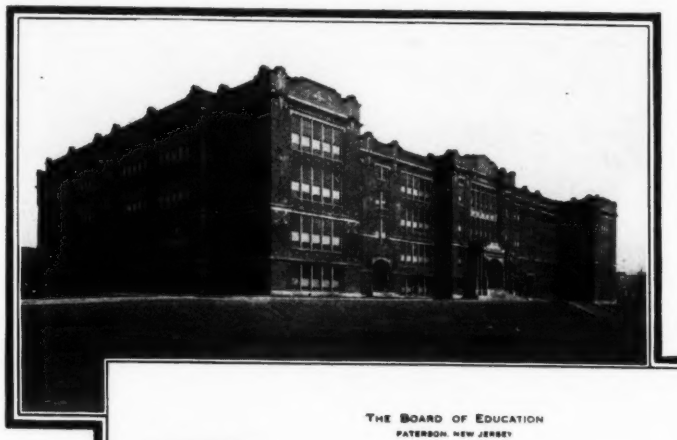
Better Locks Pay

On no other investment is the return so great as on the lock used to protect your school lockers. Mr. F. R. North, Principal of the Eastside High School, Paterson, New Jersey, says his experience with other types of locks proved that the DUDLEY KEYLESS LOCK gave the best satisfaction after an eighteen months' tryout.



THE BOARD OF EDUCATION
PATERSON, NEW JERSEY

EASTSIDE HIGH SCHOOL
OFFICE OF THE PRINCIPAL

May 16,1927

Triple Metals Corporation,
Chicago, Illinois.

Dear Sirs:

For a year and a half we have had experience with the Dudley Keyless Combination Locks which we installed in the Eastside High School, Paterson. They are used both for our house lockers and for our gymnasium lockers and we find them a satisfactory method of protecting the clothing and other belongings of the students. We decided upon combination padlocks in preference to other types of padlocks after a thorough investigation. We have no reason to believe that our decision was not a right one.

Yours truly,

Francis P. North

FRN:LP

Principal, Eastside High School.

DUDLEY LOCKS are the valuable result of trained engineering study together with many years experience in supplying school needs. They give you better lock control. There are no keys to lose. They are "pick proof," safe, dependable, and reliable. A permanent installation of DUDLEY KEYLESS LOCKS will satisfy you, and give you the satisfaction experienced by thousands of other Dudley equipped schools.

Dudley Keyless Locks are just suited for your school. Whatever your locker problem is, we shall be glad to aid you. This advice is free—just send the coupon.

Let us give you our plan whereby you can secure Dudley Locks without a cent of investment.

DUDLEY LOCK CORPORATION

(Triple Metals Corp.)
107 N. WACKER DRIVE **CHICAGO**

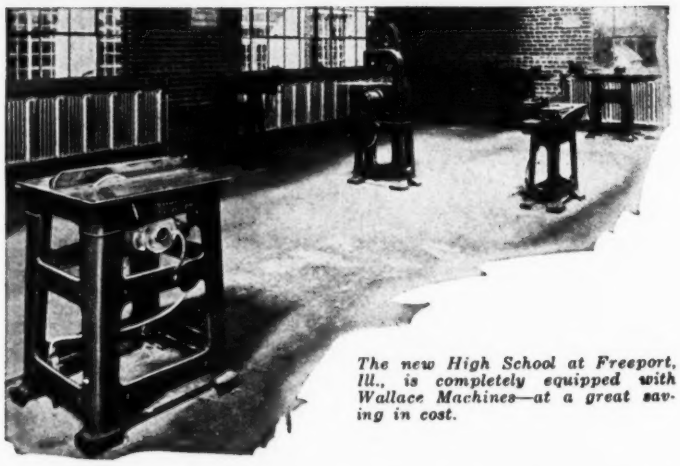
DUDLEY LOCK CORPORATION
107 N. Wacker Drive Chicago

Please send me a sample of the DUDLEY KEYLESS LOCK and details of your self-financing plan.

Name .....

Address .....

School..... **Position**.....



The new High School at Freeport, Ill., is completely equipped with Wallace Machines—at a great saving in cost.

Standard School Equipment
—SAFE FOR BOYS

Thousands of Wallace Portable Beltless Machines are in daily use in the large universities, city and township high schools, grade schools, consolidated, rural and private schools.

Send today for the Wallace Illustrated Catalog and details of the trial offer. Let us put you on our free mailing list to receive the Solar-Wallace Plan Service for Instructors. This includes illustrated job sheets which can be used as regular assignments.

Send today.

J. D. WALLACE & CO.

152 S. California Ave., Chicago, Ill.

MANUAL TRAINING BENCH No. 280

A GLANCE AT THIS NEW PATTERN will show that the combination of various sized drawers and cupboard makes an unusually practical bench. Notice, especially, the small drawer which is intended to hold nails, screws, small tools, etc., which so easily become misplaced when kept with the larger tools. Being able to immediately lay hands on these small but necessary items, will be the means of saving a great deal of time, thereby promoting efficiency. Also, notice the large cupboard, which will hold such tools and materials which can not be kept in the general or three private drawers. Bench is equipped with our Abernathy Rapid Acting Roller Nut Vise No. 70D on front, adjustable stop and dog.

C. CHRISTIANSEN

Manufacturer of this line since 1898

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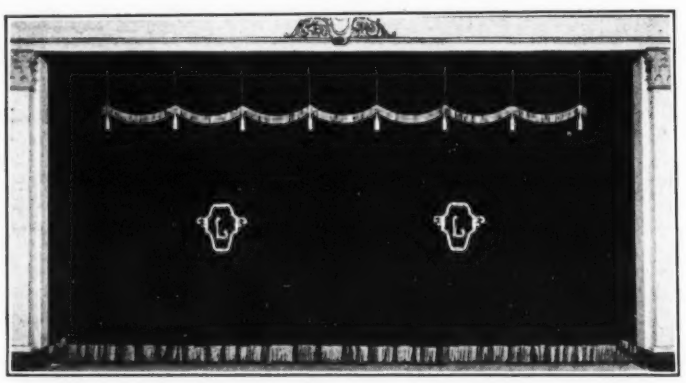
SCHOOL and COLLEGE SCENERY STAGE EQUIPMENT



Complete Stage Equipment
For School and College Auditoriums

Velour Curtains and Cycloramas
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Stage Hardware and Complete Rigging
Estimates furnished for any Stage
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The World's Most Modern Schools

recognize the importance of HAMLINIZED edge tight SOUND-PROOF DOORS and folding partitions

Northwestern University's New Buildings:
Levy Mayer Hall and Gary Library of Law, equipped with Hamlin's Sound-Proof Doors.
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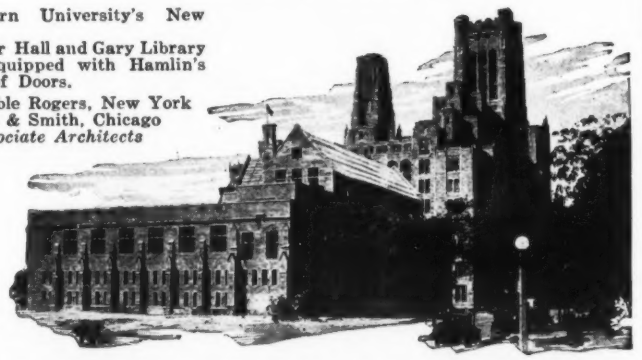

The Northwestern University, Chicago, has been equipping new buildings with HAMLINIZED Sound-Proof Doors Since 1910.

Hamlinized Folding Partitions make possible the division of assembly rooms or other large spaces into smaller recitation rooms.

Hamlinized Doors retard the transmission of distracting sound waves and favor thought concentration. Over-crowded schools can find relief by making better use of existing rooms.

Modern colleges, institutions, and churches are insulating their study rooms with **HAMLINIZED** Edge-Tight Sound-Proof Doors and Folding Partitions.

Information on request.

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Manufacturers

1510 Lincoln St. Evanston, Illinois

Clarin Chairs are made of steel (excepting seat and rubber floor contacts) and will not mar the finest floor nor damage the most delicate floor covering.

THE PERFECT FOLDING CHAIR

every user is its reference.

A sample will tell why. Permit us to send one at our expense—no obligation.

CLARIN MFG. CO., 2456 N. Crawford Ave., Chicago, Ill.

Please send by parcel-post prepaid—sample CLARIN CHAIR, finish and seat as checked:

☐ Brown (walnut) ☐ Battleship Gray ☐ Wood Seat
☐ Maroon (mahogany) ☐ Olive Green ☐ Leatherette Seat

We will either return it or pay for it after ten days' trial.

Signed.....

BOOK REVIEWS

Related Science Manual for Vocational Home-Economics Classes

By Dorothy G. Ellis and N. B. Giles. Paper, 111 pages. Price, $1.60. Published by John Wiley & Sons, New York City.

This book is intended to offer information on the content of courses in the related science of home-economics work, and the sources of reference material from which the information may be secured. The present book is a reprint of a former text which has been tried out in the classroom for the past two years. The new edition has been rearranged and improved to bring out more fully the scientific principles which form the basis for the solution of many home problems. Among the subjects treated are food, water, air, heat, light, and textiles.

The Uncle Wiggily Book

By Howard R. Garis. Cloth, 178 pages, illustrated. Price, $1. Published by D. Appleton & Co., New York.

This book is one of the series of Uncle Wiggily stories and is adapted to a variety of uses such as dramatization, story telling, drawing, and project work.

The action in the stories is aided by the excellent illustrations by Lang Campbell, whose portrayal of the author's characters has become widely known to young readers.

Teachers' Manual for Social Arithmetic

By F. M. McMurry and C. V. Benson. Book Three. Paper, 63 pages. Published by The Macmillan Company, New York.

The authors in this volume explain the philosophy underlying the McMurry-Benson Arithmetics and proceed to familiarize the teachers in the use of them. They hold that arithmetic is not the science of numbers, but consists of "quantitive thinking about subjects of real social worth."

The text consists largely of notes on the several chapters in the above mentioned arithmetic and makes plain to the teacher the manner of presentation.

International Civics

By P. B. Potter and R. L. West. Cloth, 315 pages. The Macmillan Co., New York City.

The whole range of relations between nations, their intercourse, politics, law, federation, and finally the League of Nations, is taken up in this text for high-school use. The material presented well supplements those phases of American civics which relate to our contracts with other nations and helps clarify the thinking of students in the study of history. The book is excellent in its statements on present-day conditions; the chapters on the League of Nations are quite complete and fully informing on the present status, problems, and objectives of this momentous undertaking. The author is not so satisfactory in explaining the morality of the relations of nations or the real basis upon which this rests. In explaining the origin of nations he fails to distinguish between the immediate causes and methods which caused the evolution and formation of nations and governments, and the ultimate source of authority intrusted to man by his Creator.

The Boy's Busy Book

By Chelsea Fraser. Cloth, 471 pages, illustrated. Price, $2.50. Published by Thomas Y. Crowell Company, New York.

A veteran manual-arts teacher presents here the fundamentals of woodworking, electricity, metal work, leather work, and simple concrete construction, and suggests methods of making in the home shop interesting, and usable articles. The book is practical and reflects an understanding of boy interests, abilities, and inclinations.

Industrial-Arts Test

By Harry B. Nash and Roy R. Van Duzee. Pamphlet and test sheets. Price for sets of 25 tests, $1.25. Sample sets, 25 cents. The Bruce Publishing Company, Milwaukee, Wisconsin.

The most definitely concrete products of instruction in elementary and secondary schools are those which result in the work of the industrial-arts shops and home-economics departments. The projects of, say the woodworking shop are articles which can be accurately judged for their qualities of workmanship and finish, and the information, skills, understanding of processes, etc., involved in making such articles lend themselves to definite objective evaluation. With these facts well known to instructors and supervisors, it is strange that no standard tests have been in use in these departments.

The present tests have been developed by a supervisor of long experience, and by a director of tests who has had wide practical contacts with testing and test making. They are limited to those phases of instruction in woodwork, which lend themselves to a paper test—the technical and related information on woodworking, and to a limited extent, those elements of knowledge and skill which are reflected in judgments on procedures, types of construction, etc.

The tests involve all the phases of woodworking, materials, tools, and processes with which boys in the grades and the high school come into contact. The five commonly used types of test questions have been employed. The tests have been carefully balanced and give ample evidence of the broad try-outs and validating procedures to which they have been subjected.

Ample directions for recording and scoring, interpreting and using the results are given.

Read and Do

By Maud C. Stubbings. Illustrated by Genevieve M. Watts. Paper cover, 26 pages. Price 20 cents. Published by Hall and McCreary Company, Chicago.

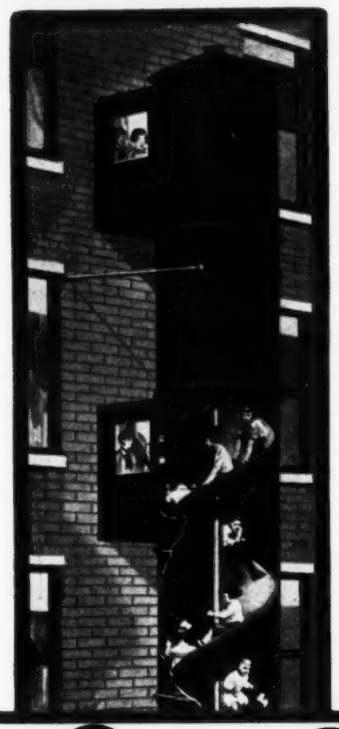
This booklet contains a series of outline drawings of fruits, flowers, animals, birds, children and houses, which are to be colored by children. The authors contend that the child must have something to do, and that in the pleasure of doing, he learns to do.

Plainer Penmanship—Intermediate Book

By John Oswell Peterson. Paper cover, 128 pages. Published by The Bruce Publishing Company, Milwaukee, Wisconsin.

This book contains selection from the more complete textbook entitled, "Plainer Penmanship for High Schools and Junior High Schools." In the selection the more useful material is retained. While it is a smaller book, it is nevertheless complete in every essential feature.

The text aims to force the pupil to face his own failure as a penman and to give him corrective means whereby his improvement will not be slow in making its appearance.



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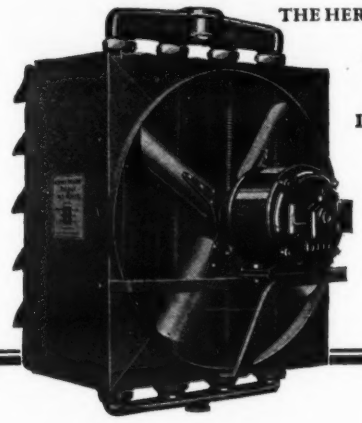

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Knives, How to Make Them

By Jay F. Knowlton. Paper cover, 38 pages. Published by The Bruce Publishing Company, Milwaukee, Wisconsin.

How to make knives in a school forge shop, is the subject of this little textbook. The author briefly tells something of the history of knives, and then discusses the kind and grade of steel used, the temper classifications, and the several uses to which knives are put.

A series of drawings showing the details of knives, and at the same time a variety of knives, accompany the text. The buffing and polishing of knives are fully entered into.

Introductory Chemistry

By Neil E. Gordon. Cloth, 628 pages. Price, $2.20. The World Book Co., Yonkers, N. Y., Chicago.

A drawback of much high-school teaching of chemistry has been due to the fact that both teachers and textbooks have been slow to introduce new principles and theories as an integral part of the work, but have rather considered them as supplementary materials. In the present book the author has sought to take the subject as it is viewed by the most advanced thinkers, and while he is cautious and conservative, he has thoroughly integrated all accepted facts and principles into a well-rounded introduction to the subject.

The first half of the book follows the minimum fundamentals outlined by the American Chemical Society and the various college entrance boards. Part II takes up additional topics which more properly belong in a college course, but which are of especial value in themselves and contribute to round out a year's work most profitably.

The author has not overlooked the element of interest, and has quite skillfully kept the practical adaptations of each topic in the foreground. The projects and readings, as well as the questions, are intended to help the student discover chemical facts for himself and to make them his own.

Minimum Essentials of Mathematics—Ninth Year

By D. W. Werremeyer and Charles H. Lake. Cloth, 244 pages. Published by Silver, Burdett and Company, Newark, N. J.

How shall the high school treat the student who is noticeably "short" in mathematical ability but who is required to take the subject in his first and second years of high school? The present book seems to be the best answer we have seen. In content, method, difficulty, it presents a reasonable course which any class should master. This is done by means of: 1. Special and adequate practice on the four fundamental operations with integers, common fractions, decimal fractions, and on a variety of practical problems in measurement; 2. Adequate practice in the use of formulas and simple equations; and 3. Work, adapted to their capacities, in the elementary and more practical parts of algebra, geometry, and trigonometry.

Even the average class of mathematically average or bright children would be benefited by much of the method adopted for this excellent work.

Automotive Essentials

By Ray F. Kuns. Cloth bound, 400 pages. Published by The Bruce Publishing Company, Milwaukee, Wisconsin.

This is a textbook on the automobile. It embodies the fundamentals of all essential automobile information. The author, who has for years headed an automotive training school, and who has written several comprehensive textbooks on the construction and repairing of automobiles, presents the present volume as a beginner's book especially adapted to high school classes where information and cultural objectives are predominant.

The opening chapter deals with the general features of automotive design followed by a chapter on descriptions of power plants, engine, carburetor, ignition devices, spark plugs, generators, starting motor, clutches, transmission and the several accessories that constitute the mechanism of an automobile.

Then follow chapters on the names and uses of engine parts, the assembling of an engine, engine theory and design, lubricating and cooling the engine, fuel systems, ignition, car wiring and lighting, the storage batteries and transmissions. These are reasonably comprehensive and quite explicit.

The author then treats with equal lucidity and clearness about the purpose of clutches, universals, propeller shafts and the motor car drive. In other chapters he explains about the rear axle, brakes, front axles, steering gears, springs and spring accessories, as well as wheels, rims and tires. In fact, every part of an automobile is described and its function explained.

Each chapter is liberally illustrated and followed by a set of review questions as well as research questions and problems involving related science and mathematics, rendering the text most serviceable to both instructor and student. An exhaustive index is supplied.

The book is prefaced with an introduction written by Dr. William H. Stone of the Ohio State University in which he says: "Undoubtedly, Mr. Kuns, the author, has hit upon an admirable presentation, viz., a wealth of well-selected pictures about which is woven simple, straightforward, interesting explanation. No one else to date has found facilities to give such a vivid pictorial presentation of the motor car as has the author of this volume; no one has surpassed his simple, succinct exposition of its parts and functions."

This tribute is unquestionably well deserved. As a textbook on the automobile it must be accepted as the most thorough, complete, and serviceable work on the subject.

Days Before History

By H. R. Hall. Cloth, 159 pages, illustrated. Price, $1.25 net. Published by Thomas Y. Crowell Company, New York City.

This is a story laid at a time when man was still struggling for the light of civilization. It tells of the days when men lived in caves and huts, used stone weapons, wore fur garments, and carried on the most primitive tilling of the soil.

The heroes are boys and men who find their surroundings attractive enough to make life interesting. The action of the story is sufficient to hold the reader, and the material is quite instructive.

The Breed-French Speller

By F. S. Breed and William C. French. Book I. Cloth, 103 pages. Book II. Cloth, 88 pages. Published by Lyons & Carnahan, Chicago.

The authors explain in a foreword that the major problems in spelling are (1) the selection of words, (2) the gradation of words, and (3) the presentation of words. In the making of this speller they have approached the subject in a scientific way and have chosen some 3,813 words, recognizing the usual child vocabulary and the ordinary vocabulary of adults. The gradation, too, is based upon careful study.

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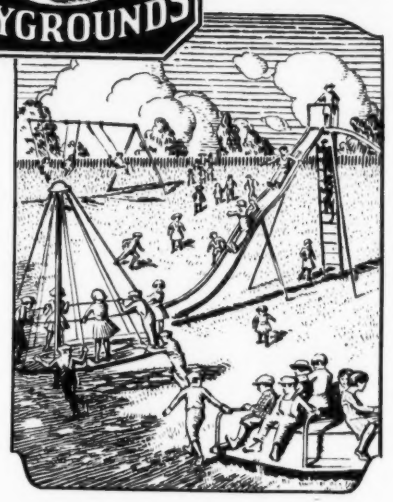

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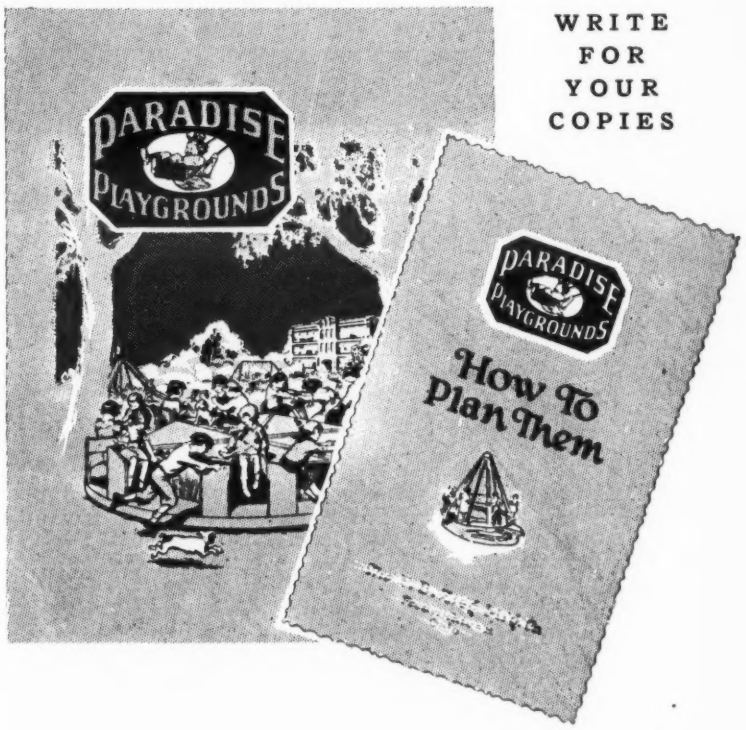

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Index of School-Bond Prices*

Harold F. Clarke, Indiana University

What will be the trend of school-bond prices during the year 1928? The net yield of school-bond prices during the past two months will throw some light upon this question.

The School-Bond Index, representing the net yield of school bonds, declined from 4.50 per cent to 4.28 per cent during the month of November. This represents a fall of 22 points in a month, a most unusual drop and one that is not likely to continue. This means that the interest rate on all school bonds sold was only 4.28 per cent as compared with 4.50 per cent a month earlier. Records are not yet available for all school-bond sales for December, but the records that are available indicate that there will be a slight continued fall during the first part of the month and former years indicate that there will be a slight rise during the last of the month.

This slightly higher interest rate may continue during the early part of January, but by the middle of the month the bond index will probably be down to the November-December level, and by the end of January may be even lower. It would be just as well not to issue bonds the first half of January, as the latter half usually sees lower interest rates. The last half of January and the first half of February are usually periods of high bond prices or good periods to sell bonds.

The best opinion seems to be that the first quarter of the year will see interest rates, in general, continue to fall. This should mean firm or rising bond prices and should furnish a good market for school bonds at slightly improving prices.

Last month, one of the fair-size cities of the country sold an issue of school bonds on a net interest basis of only 3.55 per cent. This should furnish a challenge for some city to go even lower this month and should make the large cities and all cities with good credit look very carefully at issues around 4 per cent to see if it is not possible to sell bonds at a lower rate.

The average yield of all school bonds sold during each month of the year 1927, as tabulated in Table I, shows the prevailing rate of interest on the school bonds and is an approxi-

*Copyright, 1928, by Harold F. Clark.

TABLE I.

Average Yield of All School Bonds Sold During the Month.

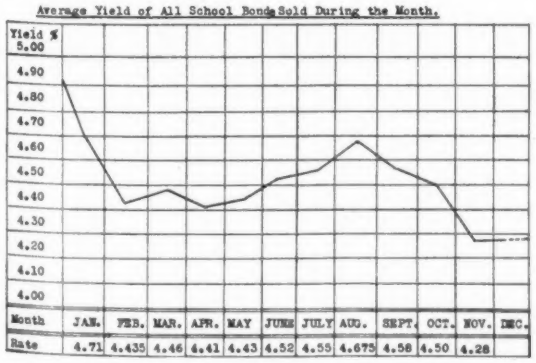

TABLE I.

TABLE II

	November, 1927
School bonds sold during the month[1]	$ 26,338,687
All municipal securities sold during the month	101,019,664
All municipal securities sold during the year (to date)	1,315,245,300
All school bonds outstanding (estimated)	2,290,000,000
Average yield of all school bonds outstanding (estimated)	4.68%
Yield of school bonds of ten large cities sold during the month	3.99%
Yield of United States long-term bonds (quotation the middle of November)	3.29%

[1]The monthly totals of school bonds do not include all the bonds issued in that month due to the difficulty of obtaining the yields on some of the issues.

TABLE IV

Average Yields of Long-Term Federal-Government Bonds

Past Twelve Months Month	Rate %	Past Five Years Year	Rate %
1927		1927	3.196
December	3.21[4]	1926	3.544
November	3.29[4]	1925	3.797
October	3.43	1924	4.010
September	3.44	1923	4.298
August	3.45	1922	4.301
July	3.48		
June	3.47		
May	3.44		
April	3.47		
March	3.48		
February	3.58		
January	3.60		

[3]Taken from the Federal Reserve Bulletin.
[4]Calculated from the New York Stock Exchang quotations and not the final Federal Reserve Board average.

TABLE III

Bond Sales[2]

Year	School	Municipal	All Public and Private	Average Rate at Which Bonds Were Sold Year	Municipal
1927	.....	.....	.....	1927	....
1926	$ 260,000,000	$1,365,000,000	$6,311,000,000	1926	4.61
1925	323,000,000	1,399,000,000	6,223,000,000	1925	4.58
1924	288,000,000	1,398,000,000	5,593,000,000	1924	4.26
1923	208,000,000	1,063,000,000	4,303,000,000	1923	4.76
1922	237,000,000	1,101,000,000	4,313,000,000	1922	4.81
1921	215,000,000	1,208,000,000	3,576,000,000	1921	5.18
1920	130,000,000	683,000,000	3,634,000,000	1920	5.12
1919	103,000,000	691,000,000	3,588,000,000	1919	5.04
1918	41,000,000	296,000,000	14,368,000,000	1918	4.90
1917	60,000,000	451,000,000	9,984,000,000	1917	4.58
1916	70,000,000	457,000,000	5,032,000,000	1916	4.18
1915	81,000,000	498,000,000	5,275,000,000	1915	4.58
1910	42,000,000	320,000,000	2,400,000,000	1910	4.38

[2]By special permission based upon sales reported by the Commercial and Financial Chronicle.

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TABLE V
Security Prices[5]

Date 1927	Average Price of 228 Stocks	Average Price of 40 Bonds
December	193.[6]	....
November	189.	99.7
October	186.2	99.6
September	191.1	98.00
August	179.3	97.76
July	171.7	97.03
June	168.5	97.06
May	167.5	97.55
April	166.2	97.24
March	159.0	96.63
February	156.9	96.44
January	153.5	96.43

[5]As reported by the Standard Statistics Company, Inc. Used by special permission.
[6]Not final.

TABLE VI
Revised Index Number of Wholesale Prices[7]

Month 1927	All Commodities	Building Materials	Year	All Commodities	Building Materials
Nov.	97.2[7]	91.3[7]	1927	.....	.....
Oct.	97.0	91.6	1926	100.	100.
Sept.	96.5	92.1	1925	103.5	101.7
Aug.	95.2	92.9	1924	98.1	102.3
July	94.1	93.7	1923	100.6	108.7
June	93.8	94.6			
May	93.7	95.1			
April	93.7	95.0			
March	94.5	95.3			
Feb.	95.9	96.2			
Jan.	96.6	97.5			

United States Bureau of Labor Statistics, 1926=100.
[7]Not final.

mate norm by which school-bond rates can be judged.

A general summary of school bonds and municipal securities sold during the month of November is given in Table II.

The comparison between the school bonds, the municipal bonds, and the combined public and private bonds, as indicated in Table III, throws additional light upon the desirability of issuing school bonds at a particular time of the year.

Table IV shows the average yield of long-term Federal-Government bonds for the past twelve months and for the past five years, which furnish a rate to be striven for in issuing school bonds. A school issue cannot go below this yield, except in the case of some local and probably temporary disturbance in the finances of a community. It is interesting to note that when the rate on the long-term Federal-Government bonds drops, the interest rate on school bonds also drops.

The security prices listed in Table V and the wholesale prices listed in Table VI are a general indication of the probable trend of school-bond prices. Since a major portion of a school-bond issue is spent for capital outlay, the price of building materials is important and deserves consideration.

IMPORTANT SCHOOL-BOND SALES OF THE PAST MONTH

Florida—Broward Co., Fla., Board of Public Instruction ..... $ 250,000
Florida—Polk Co., Fla., Spec. Tax School District No. 1 280,000
Georgia—Atlanta, School 500,000
Indiana—Lafayette, Ind., School District 250,000
Massachusetts—Quincy, School 250,000
Michigan—Bloomfield, Troy, Royal Oak and Southfield Twps., Mich., Fractional School District No. 1 260,000
Michigan—Fordson, Mich., School District 560,000
New Jersey—East Orange, School Series MM 268,000
New Jersey—N. Bergen Twp., School 1,239,000
New Jersey—Phillipsburg, N. J., School. 599,000
New Jersey—Ridgewood Twp., School District 423,000
New Jersey—Union City, School 773,000
New York—Buffalo, N. Y., School 3,880,000
New York—Hempstead, Union Free School District No. 27 251,000
New York—Massena, N. Y., Union Free School District 300,000
New York—New Castle and Mt. Pleasant, Central School District No. 4 325,000
New York—New York, N. Y., School Construction 1,050,000
New York—Oyster Bay, N. Y., Union Free School District No. 9 650,000
New York—Poughkeepsie, School Series B 330,000
New York—Rochester, School Revenue... 1,750,000
North Carolina—Catawba Co., School 450,000
Ohio—Garfield Heights, Ohio, School District 550,000
Ohio—Cincinnati, School District 625,000
Ohio—Parma, School District 464,000
Ohio—Washington Twp., Ohio, Rural School District 376,266
Pennsylvania—Philadelphia, School District 2,000,000
Pennsylvania—Hazleton, Pa., School District 275,000

DR. HARMAN BECOMES DIRECTOR OF EDUCATIONAL ADMINISTRATION IN ALABAMA

Dr. A. F. Harman, formerly superintendent of education in Montgomery county, Alabama, on January 1, assumed the office of director of educational administration for the state of Alabama. In his new work, Dr. Harman acts as consulting specialist on problems of administration and supervision which the school boards of the state may present for solution.

Dr. Harman has long been recognized as a leader in educational affairs not only in the state of Alabama, but throughout the country. He has been connected with educational affairs in the state for more than a quarter of a century, having filled the office of superintendent at Selma, Decatur, and Florence. Dr. Harman held the office of county superintendent during the last seven years, having been appointed in July, 1920.

The members of the teaching profession have honored Dr. Harman in various ways. He has been chairman of the executive committee of the Alabama Educational Association, president of the association, head of the department of city superintendents of the association, and also president of the rural-education department of the National Education Association.

Dr. Harman's place on the county board of education has been filled by the appointment of Mr. T. L. Head, assistant county superintendent, who will perform the duties of the office for the remainder of the school year.

—Mr. M. Channing Wagner, principal of the high school at Wilmington, Del., has been elected president of the Delaware Education Association, to succeed Mr. W. H. Jump.

—Mr. H. M. Corning of Trinidad, Colo., has been elected superintendent of schools at Colorado Springs. Mr. Corning is succeeded by Mr. Gilbert S. Willey. Mr. Willey, in addition to his work as superintendent, will also act as director of the Trinidad Junior College.

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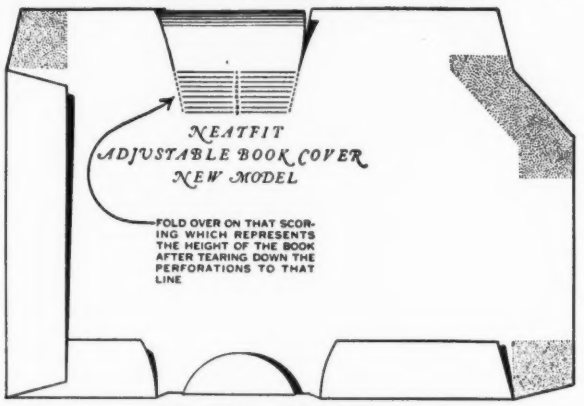
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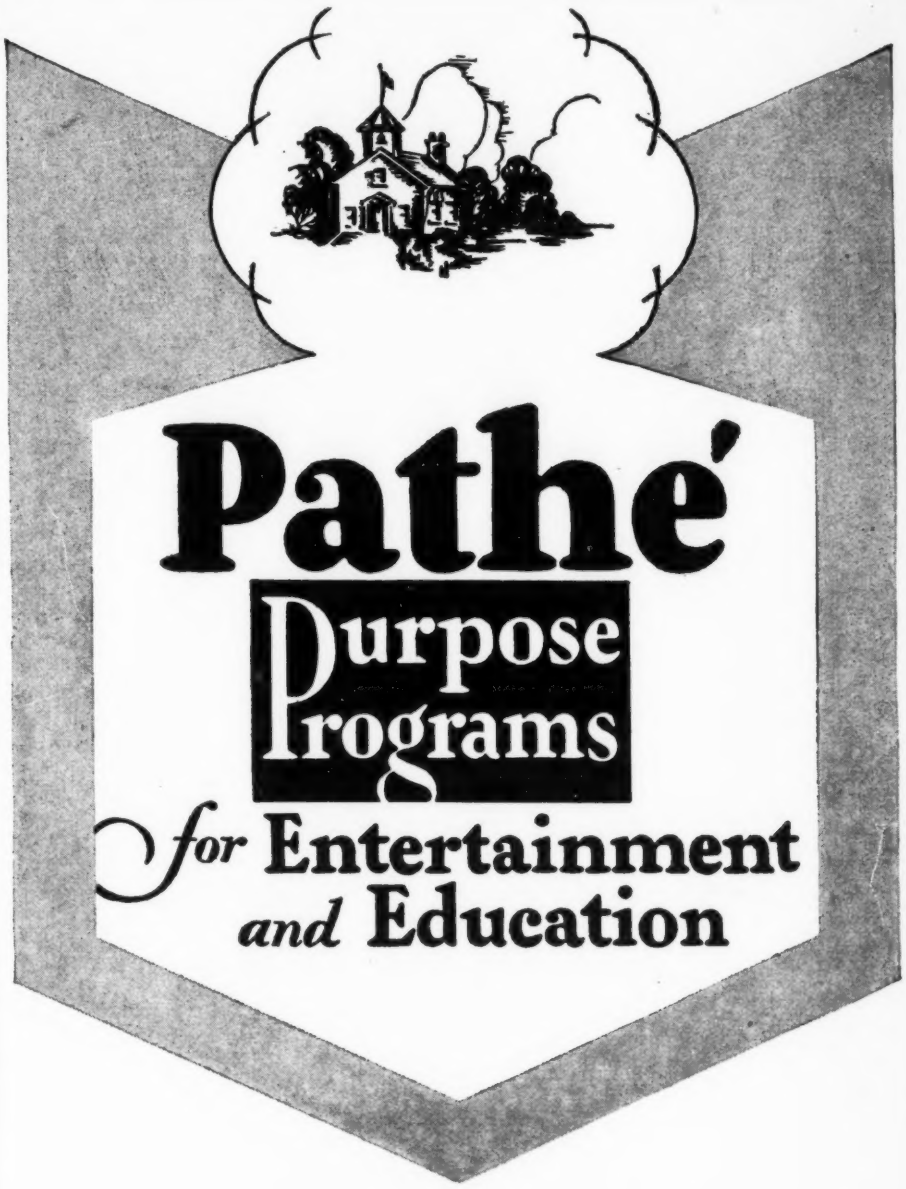

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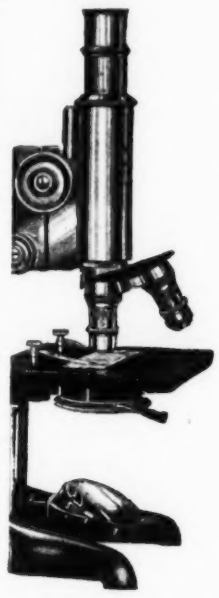

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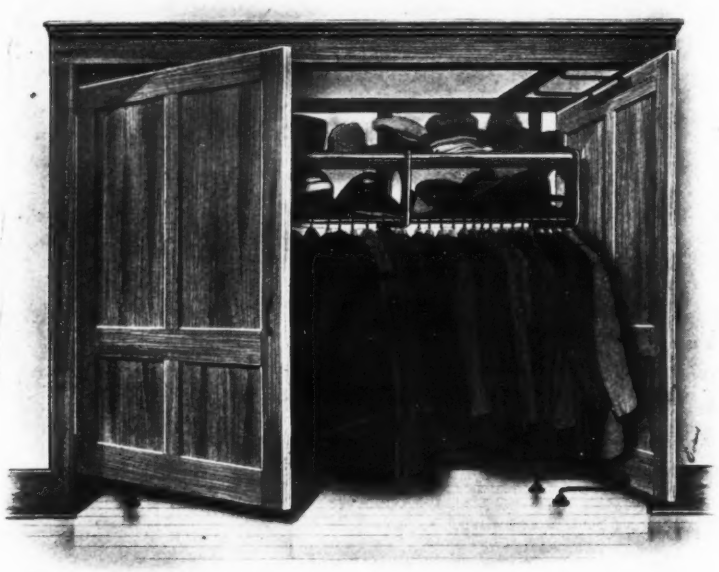

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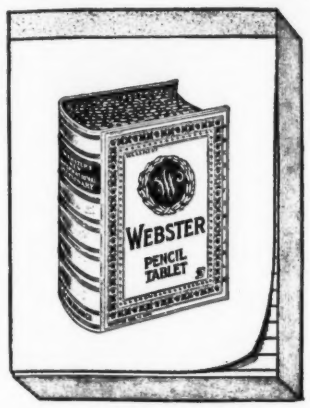

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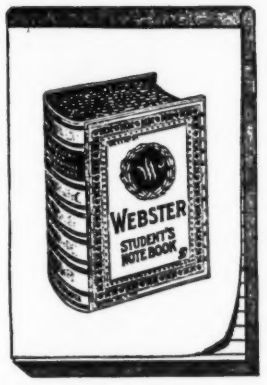

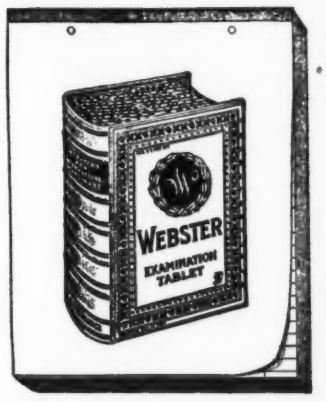

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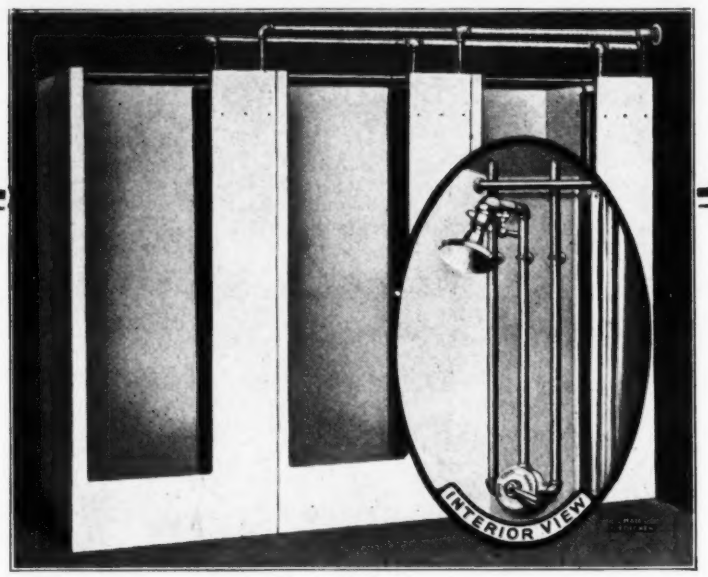
SCHOOL-BUILDING PROGRAMS IN THE CITIES OF THE UNITED STATES

The following tabulation is the result of an inquiry concerning the present building program in cities of 25,000 population and upward, throughout the United States. Cities which have no buildings under construction at present and which do not expect to erect buildings in 1928 are omitted from the list.

City	Buildings Under Construction	Buildings Proposed
ALABAMA		
Huntsville	$ 16,000	$ 30,000
ARIZONA		
Phoenix	107,000	100,000
ARKANSAS		
Fort Smith	37,500	515,000
Hot Springs	10,000	20,000
CALIFORNIA		
Berkeley	90,000	.....
Fresno	554,000	465,000
Long Beach	200,000	.....
Los Angeles	1,961,136	919,000
Oakland	1,950,998	1,991,500
Pasadena	65,550	165,000
Riverside	875,000	100,000
San Bernardino	34,000	100,000
San Francisco	2,840,000	1,725,000
Santa Barbara	640,000	.....
COLORADO		
Denver	528,284	260,000
Greeley	350,000	.....
CONNECTICUT		
Bristol	57,100	85,000
Norwalk	.....	450,000
DELAWARE		
Wilmington	1,000,000	1,575,000
DISTRICT OF COLUMBIA		
Washington	3,350,000	1,477,000
FLORIDA		
Tampa	798,000	160,000
GEORGIA		
Athens	.....	12,000
Atlanta	.....	2,054,100
ILLINOIS		
Aurora	.....	350,000
Cicero	2,000,000	200,000
Chicago	19,000,000	69,000,000
E. St. Louis	116,000	.....
Oak Park	675,000	.....
Rockford	.....	300,000
Rock Island	.....	200,000
INDIANA		
East Chicago	65,000	200,000
Fort Wayne	135,000	372,000
Kokomo	.....	400,000
Richmond	.....	100,000
IOWA		
Des Moines	460,000	.....
Waterloo	1,700,000	.....
KANSAS		
Topeka	160,000	250,000
KENTUCKY		
Covington	500,000	.....
Lexington	450,000	.....
MAINE		
Bangor	375,000	.....
MARYLAND		
Baltimore	2,349,545	10,000,000
MASSACHUSETTS		
Chicopee	.....	300,000
Fall River	220,000	1,000,000
Holyoke	.....	500,000
Lynn	550,000	.....
Malden	500,000	.....
Newton	600,000	600,000
Quincy	311,000	.....
Revere	217,592	.....
Salem	500,000	.....
Taunton	450,000	250,000
Worcester	.....	850,000
MICHIGAN		
Flint	1,575,000	.....
Grand Rapids	300,000	.....
Jackson	275,000	.....
Lansing	962,816	.....
MINNESOTA		
Minneapolis	505,000	1,000,000
St. Paul	250,000	.....
MISSOURI		
Joplin	510,000	80,000
Kansas City	315,814	.....
St. Louis	600,000	.....
St. Joseph	25,000	.....
NEBRASKA		
Lincoln	920,000	300,000
NEW JERSEY		
Atlantic City	700,000	300,000
Irvington	300,000	300,000
Passaic	850,000	.....
Paterson	500,000	625,000
Plainfield	545,000	150,000
West New York	1,500,000	.....
NEW YORK		
Albany	1,500,000	.....
Binghamton	1,000,000	750,000
Buffalo	3,046,516	5,091,600
Mount Vernon	465,000	820,000
New Rochelle	1,000,000	300,000
New York	21,878,295	31,108,000
Poughkeepsie	.....	720,000
Rome	.....	200,000
Schenectady	.....	1,100,000
Syracuse	1,525,000	900,000
Watertown	.....	1,000,000
OHIO		
Cleveland	1,900,000	6,010,000
Dayton	1,140,000	.....
East Cleveland	.....	800,000
Lakewood	.....	250,000
Columbus	2,255,900	322,000
Portsmouth	80,000	.....
Springfield	130,000	.....
Toledo	1,426,000	2,185,000
Youngstown	765,000	150,000
OKLAHOMA		
Oklahoma City	125,000	1,294,000
OREGON		
Portland	1,325,000	1,400,000
PENNSYLVANIA		
Altoona	900,000	825,000
Erie	140,000	1,300,000
Lancaster	1,130,000	.....
McKeesport	.....	1,500,000
New Castle	909,437	.....
Philadelphia	9,070,000	11,800,000
Scranton	452,472	.....
Wilkes-Barre	1,500,000	120,000
Williamsport	540,000	410 000
York	.....	800,000
RHODE ISLAND		
Providence	750,000	3,000,000
TENNESSEE		
Chattanooga	430,000	.....
Nashville	.....	1,000,000
TEXAS		
Beaumont	.....	1,330,000
Dallas	700,000	.....
Fort Worth	2,390,000	.....
Houston	.....	400,000
San Antonio	.....	1,500,000
Wichita Falls	250,000	.....
UTAH		
Ogden	95,000	100,000
VIRGINIA		
Newport News	.....	120,000
Richmond	.....	705,000
WASHINGTON		
Bellingham	135,000	50,000
Seattle	1,820,000	1,516,000
Spokane	475,000	.....
WEST VIRGINIA		
Charleston	.....	250,000
Clarksburg	100,000	.....
WISCONSIN		
Green Bay	900,000	.....
La Crosse	184,000	.....
Milwaukee	2,775,000	2,415,000
Madison	.....	250,000
Racine	1,250,000	.....

ADMINISTRATION

—School Dist. No. 1 of Teller county, Colorado, is a first-class district, one of the 25 in the state. The district includes all of the Cripple Creek district and comprises six communities, three with city governments, and three with town governments. The two largest, Cripple Creek and Victor, are six miles apart. The shrinkage in mine activities since the gold rush has been reflected somewhat in the school activities. There are one high school and one grade school located in each city. Three bus lines transport the pupils from Independence, Cameron, Goldfield, and Elkton, into Victor to the grade school and the high school. The four schools are under the supervision of Supt. C. B. Baldwin, who maintains an office at Cripple Creek.



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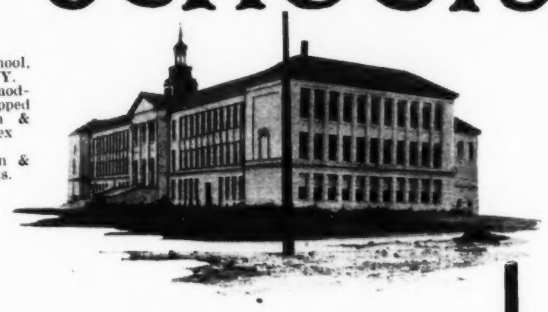

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Schedule of Standardized Rooms in Academic High Schools, New York City

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Room	Number of Pupils	Floor area per pupil in sq. ft.	Total floor area in sq. ft.
Auditorium	1200 to 2000	About 7½ sq. ft. exclusive of stage	
Biology Laboratory...	36	26	934
Recitation Room...	34	19	644
Preparation Room..	..	..	483
Storeroom	..	..	160
Plant Room.....	..	..	33
Office	..	..	322
Note—Number of recitation rooms and laboratories as required for each school.			
Bookkeeping	35	18	644
Business Practice.....	35	28	966
Chemistry Lab., A....	36	26	966
Chemistry Lab., B..	32	29	966
Recitation Room...	35	18	644
Preparation Room..	..	..	322
Apparatus Room....	..	..	214
Balance Room.....	..	..	161
Acid Room.....	..	..	107
Office	..	..	322
Note—Number of laboratories and recitation rooms as required for each school.			
Classroom	35	18	644
Cooking Room.....	40	32	1288
Commercial Room....	35	18	644
Commercial Geography	35	28	966
Dark Room.....	..	..	150
Drawing Room.....	36	27	966
Office	..	..	322
Storeroom	..	..	322
Note—Number of drawing rooms as required for each school.			
Dressmaking Room...	36	27	966
Fitting Room.....	..	..	196
Storeroom	..	..	55
Note—Number of dressmaking rooms as required for each school.			

Room	Number of Pupils	Floor area per pupil in sq. ft. Floor area	Total floor area in sq. ft. Total
General-Science Room.	36	27	966
Preparation Room..	..	..	483
Storeroom	..	..	160
Note—Number of general-science rooms as required for each school.			
General Shop.....	30	43	1288
Storeroom	..	..	322
*			
Homemaking	40	24	966
Home Nursing.....	35	28	966
Hygiene Classroom...	35	18	644
Library:		20	...
Four to five per cent of pupil capacity.			
Library Classroom..	35	18	644
Teachers' Alcove....	..	..	322
Workroom	..	..	200
Stackroom	..	..	Varies
Millinery	36	27	966
Storeroom	..	..	50
Music Room.....	105	9	966
Office	..	..	80
Storeroom	..	..	80
Natatorium			
Pool, 28 by 75 ft.			
Girls' showers, 18 shower stalls, 36 dressing compartments.			
Boys' showers, shower room with 15 shower heads.			
Boys' locker and dressing room to accommodate about 100.			
Physics Laboratory...	38	25	966
Lecture Room.....	72	14	966
Recitation Room...	35	18	644
Preparation Room..	..	..	322
Storeroom	..	..	322
Office	..	..	322
Physiography Lab.....	36	27	966
Science Classroom....	35	18	644
Sewing Room.....	36	27	966
Fitting Room.....	..	..	196
Storeroom	..	..	55
Note—Number of sewing rooms is as required for each school.			
Typewriting	40	24	966

*Gymnasium at end of list.

Note—One general shop in each academic high school.

Gymnasium: Number and size varies with pupil capacity of school. Total floor area of gymnasiums equals 30 sq. ft. multiplied by the pupil capacity, divided by the number of class periods, that is, 30 sq. ft. multiplied by the number of pupils using the gymnasium each period.

CLIFTON AVENUE GRADE SCHOOL, LAKEWOOD, N. J.

The town of Lakewood, New Jersey, is celebrated as a health resort and is a fast-growing community, peopled by those who seek health for themselves or their children, and consequently demands a superior kind of school accommodations. The Clifton Avenue Grade School, which is illustrated in this issue of the SCHOOL BOARD JOURNAL, is the latest addition to the Lakewood School System.

The building contains the usual classrooms, auditorium, and playcourts in a very liberal fashion.

The exterior is of variegated buff brick with limestone trim. It has been the endeavor to make an unusual entrance and the arcaded portico has been the result.

This building has a total pupil capacity of 740, contains 600,000 cubic feet, and cost $285,000, exclusive of land and equipment.

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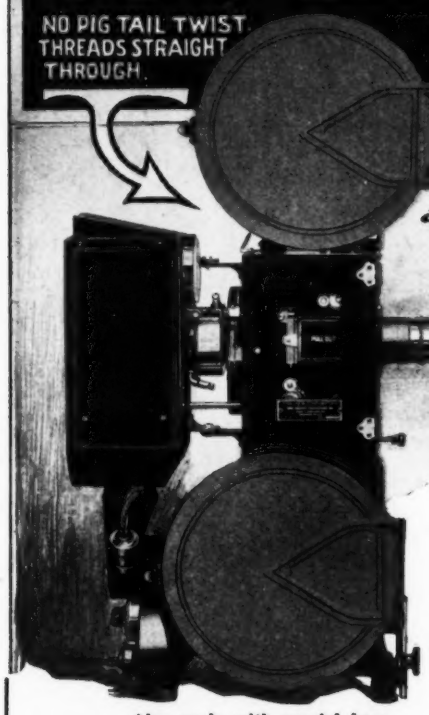

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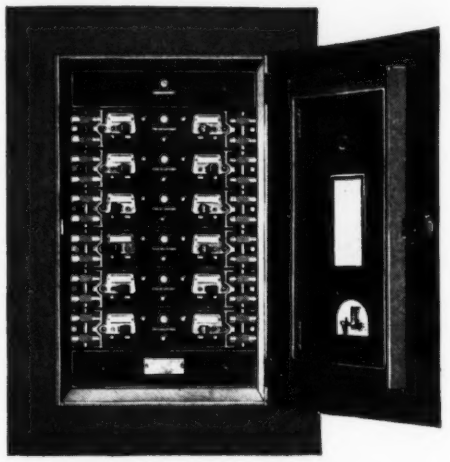

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contains valuable ideas in the use and manipulation of stage scenery and settings with particular appeal to amateur dramatic units —

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in schools, clubs, community centers, etc.,

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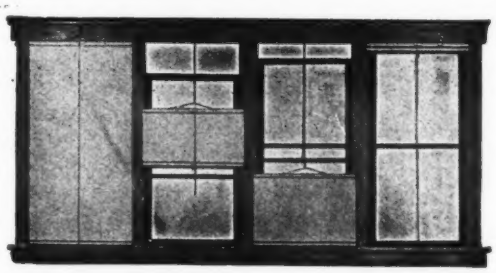

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Solid Bronze Bowl and Bubbler.

All brass supply pipe, valve and inner works. Nothing to corrode.

Heavy cast iron pedestal.

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Most satisfactory, sanitary and economical soap service in School Wash Rooms containing two or more wash basins. Soap Valve service at each basin: as pictured. Can readily be installed in building already erected without defacing walls: as well as included in new building plans. Highly developed and perfectly practical in principle, material, construction, workmanship, finish AND SERVICE PERMANENCY. Write for fully descriptive literature.

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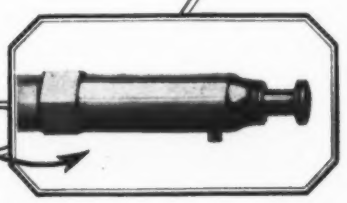

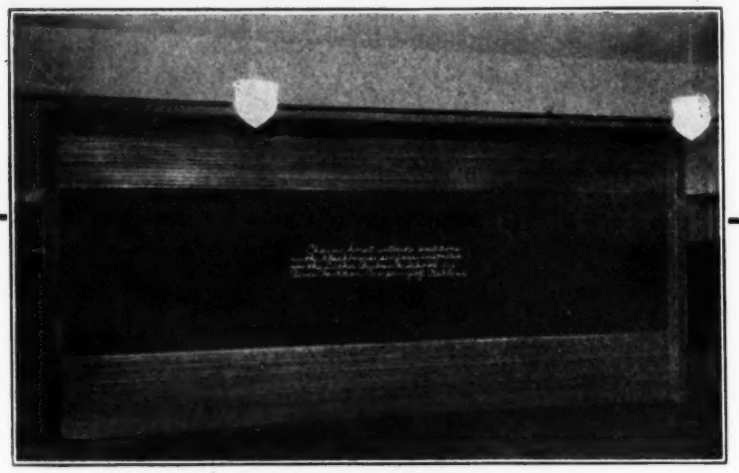

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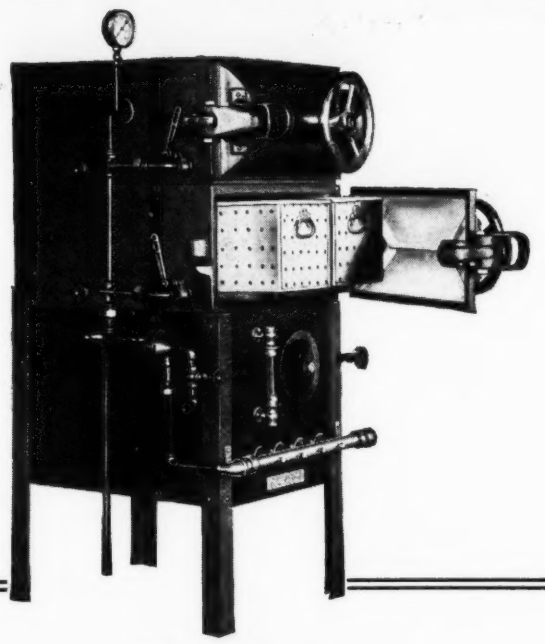

This New GAS FIRED Sectional Steam Cooker
is unequalled for its food advantages—

It means tender and more palatable cooking without shrinkage or burning.

So simple to operate any kitchen attendant can use it with excellent results.

It meets the needs of schools wherever gas or steam is available.

Economical in operation.

Investigate its unusual merits.

The CLEVELAND RANGE Co.

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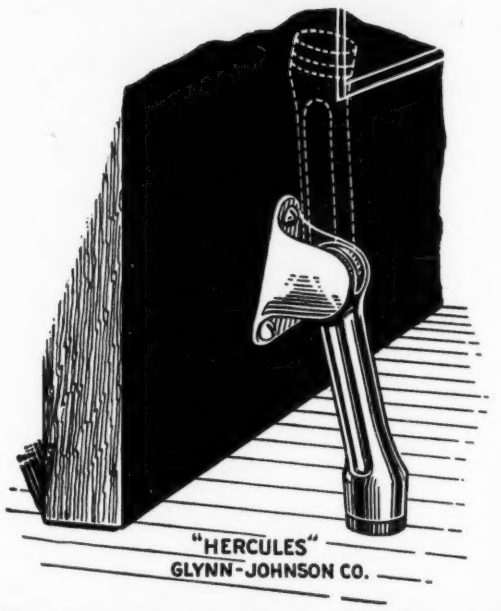
"Everything for the Kitchen and Dining Room"

A SILENT EFFICIENT DOOR HOLDER



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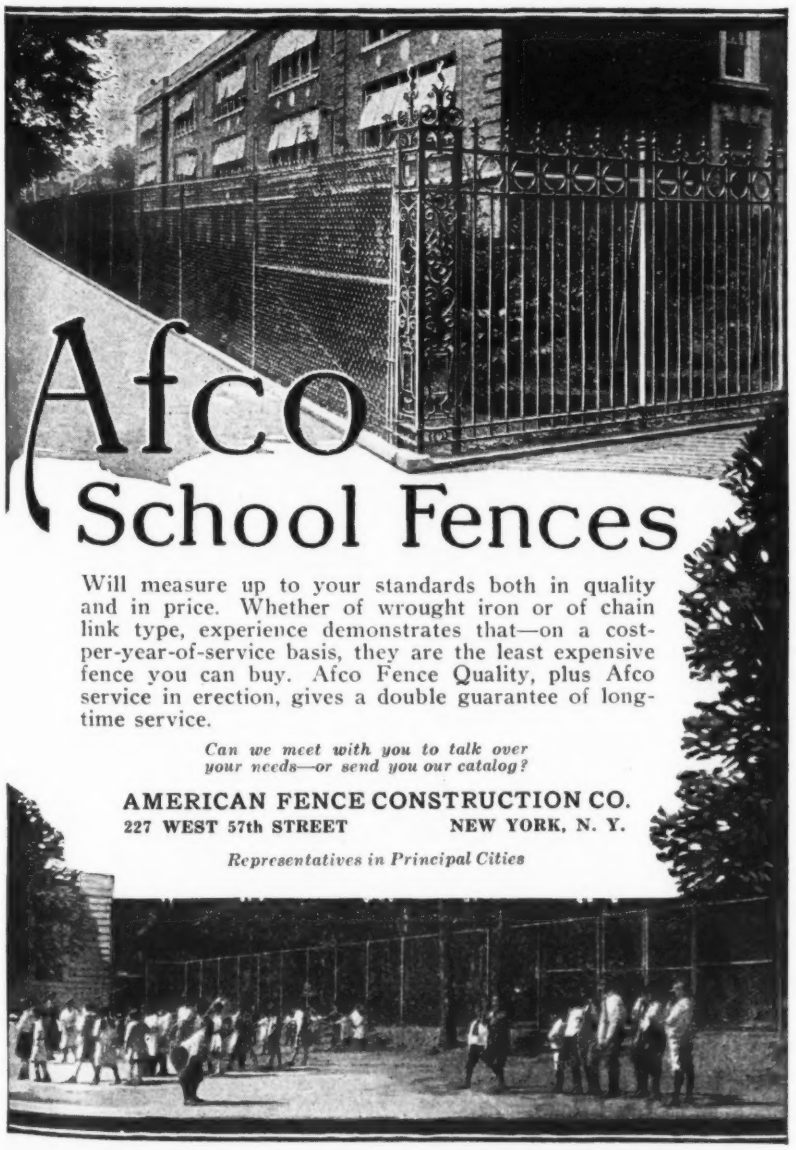

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Will measure up to your standards both in quality and in price. Whether of wrought iron or of chain link type, experience demonstrates that—on a cost-per-year-of-service basis, they are the least expensive fence you can buy. Afco Fence Quality, plus Afco service in erection, gives a double guarantee of long-time service.

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NO FATALITIES at this school fire

Flame, Heat, Gases, Smoke, Ice, and Snow cannot deter the safe exit of children and teachers from the second or third floor of a burning schoolhouse, when a POTTER TUBULAR SLIDE is attached.

PANICS, which are more to be dreaded than fires, cannot happen, as fire drills are practiced on the Fire Escapes. There is no danger of crowding, the children becoming frightened into jumping or falling by accident, as is possible with all other types.

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The only Fire Escape with Service Records approved by the Underwriters' Laboratories.

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Asbestos curtains,

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Stage scenery for your Auditorium stage.

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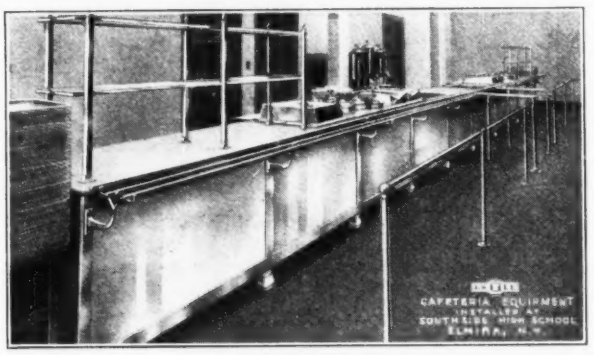
"Everything for the Kitchen and Serving Room"

Properly Designed and Built for Service

Our engineering department with 37 years of specialized experience will be pleased to assist you in planning your cafeteria without obligating you in any way.

Your Inquiry Is Solicited



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PROMOTE BOTH CLEANLINESS AND SANITATION | REQUIRE BUT A MINIMUM OF JANITOR SERVICE

"The First Cost is the Last Cost"

Bradley Washfountains represent a great advance in modern washroom equipment. They promote both cleanliness and sanitation, are self cleaning and require but a minimum of janitor service.

And Bradley Washfountains are most economical. Their use reduces the number of fixtures required. They save floor space, use less water, and permit the use of fresh tempered water at all times.

For use in Schools, Colleges and Universities and in every type of public lavatories, there is no fixture equal to the Bradley Washfountain in utility, durability and beauty and in economy of operation and maintenance.

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Improved Painting — Lowered Labor Costs

These two spray-painters are doing the work of 8 to 10 brush men. They are applying a smoother, more uniform coating of paint, a coating that completely covers the surface and that has the hiding power of two brushed coats. Consider this improvement in quality of work and this economy of close to 80% saving in labor cost that painting the DeVilbiss way makes possible.

The DeVilbiss Spray-painting System will enable you to do *your* school painting with the same marked degree of advantage and profit.

A word from you will promptly bring further interesting facts.

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DeVilbiss
Spray-painting System

When Henry Ford first motored down Michigan Avenue

THIS good old world was traveling in low gear. Today, overnight almost, men, machines, methods are being scrapped or stepped up! Business is traveling fast! Competition sets a stiff pace. In the "heart" of your business—the kitchen—where profits are made or lost—obsolete dishwashing equipment and hand labor should be banned because too slow, too inefficient, too costly! Colt Autosan Dishwashing Machines wash faster, cleaner! They speed dish traffic and "turnover"—prevent jams—reduce breakage—improve service—and cut down overhead, by paying their own cost and way in labor saving alone! *Investigate!*

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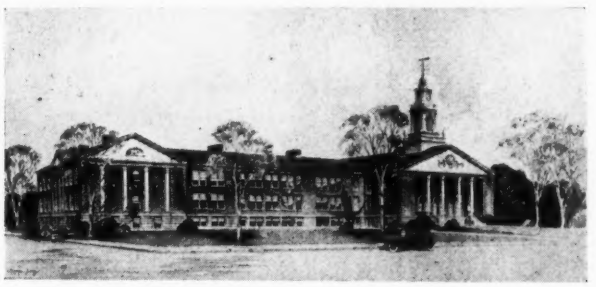
For Your Next Utensil Or Installation . . . **DOUGHERTY**



Dougherty Equipped Northside High School, Corning, N. Y.
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DOUGHERTY CAFETERIAS Pay for Themselves

INSTALLING a Dougherty Cafeteria doesn't mean adding to the maintenance expense of the school.

Built by modern methods to last indefinitely, DOUGHERTY CAFETERIAS will start paying for themselves from the first day of operation . . . and will continue to be a self-supporting department during many years of reliable service.

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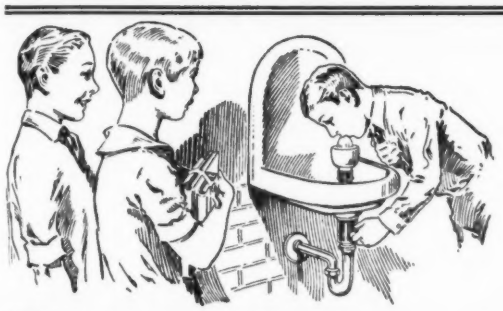

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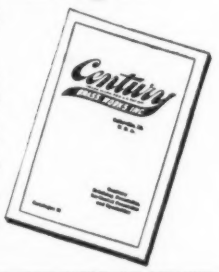
Drink Plenty of Water!

Plenty of pure drinking water is vital to child growth. Sanitary dispensers are a recognized requisite.

In perhaps no other place, outside of schools, does the drinking fountain play such an important part in the lives of the users and in cost of building maintenance.

Sanitation, water waste, repairs, and length of service are the four important factors to be considered by School Boards entrusted with the purchase of drinking equipment.

Century School Fountains pass these exacting requirements in every detail. They are built for service and economy.



We will be pleased to assist in selecting the right equipment for any particular building without the slightest obligation.

The complete Century catalogue illustrates and describes Century Fountains. It is free for the asking. **Century Brass Works, Inc., Belleville, Ill.**

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Drinking Fountains & Shower Heads

NICKEL PLATED ALUMINUM

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FOOD can't get into the pores of Permalium trays as it does in unplated aluminum trays. The hard nickel plating provides an effective barrier. For this reason Permalium trays are easy to clean and keep sanitary. Simply wash them in soap and water—not steel wool or powder abrasives.

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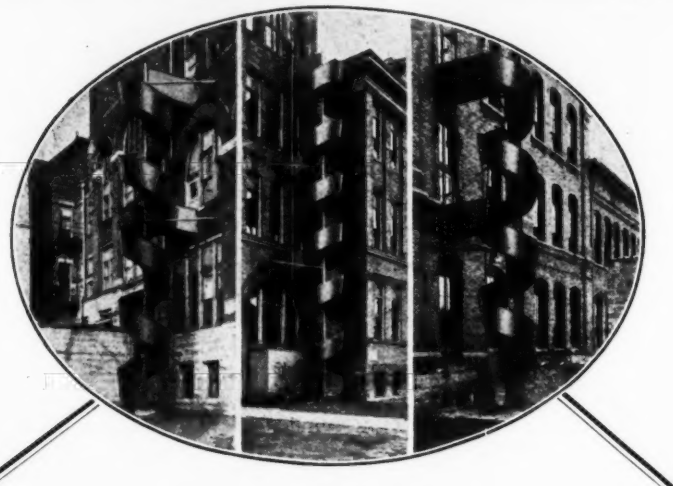

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NEW school buildings, old school buildings, or remodelled school buildings all need one thing in common and that is good facilities for emptying the building in case of fire.

Standard Spiral fire escapes are low in price; they will handle more people in less time than any other type; they eliminate the "fear of high places" and the possibility of congestion; they are an ornament to any building (can be "built in" new buildings). You'll find them on schools throughout the United States and we've never had a complaint in all the years we've been building them.

If you are interested in modern fire escape equipment, send for catalog N-6.

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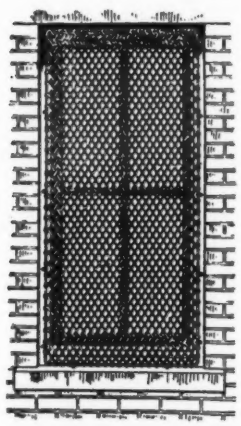

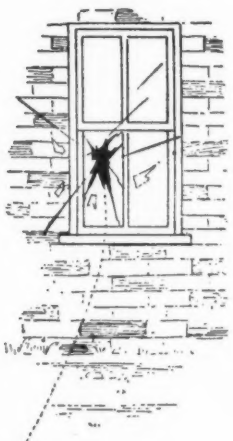

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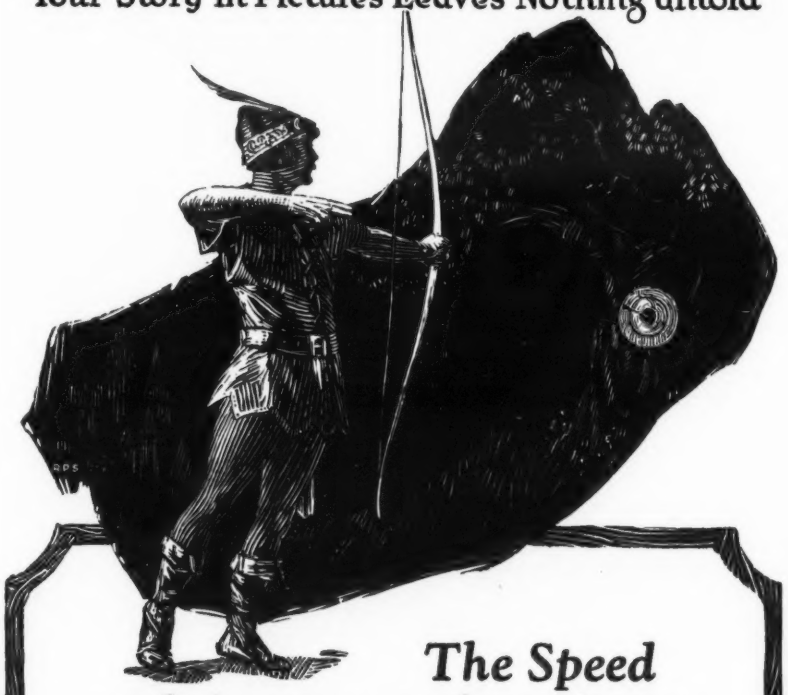

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From Coast to Coast

Come Words of Praise for

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THE PERFECT FLOOR TREATMENT

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We received our first shipment of your TRI-C products late in August and finished the maple floors throughout one of our Intermediate Schools with your treatment. The results have been so satisfactory that the Board of Directors has authorized the use of this finish for all hardwood floors throughout our system. We find that sweeping is very much easier and that there is practically no dust raised.

Tacoma Public Schools.

Hendersonville, N. C.

For several years we have been investigating floor dressings and using chiefly floor oils. This year we definitely determined to get away from these as far as practicable. After searching for the best available floor preparation, we decided upon Car-Na-Var, which we have tried this season with gratifying results. It combines both the qualities of preservation and a good clean durable finish.

We have received our second 55 gallon shipment of your TRI-C products and the results have been so satisfactory that we shall use this finish for all hardwood floors throughout our system. We find that the use of this preparation very greatly simplifies the care of our hardwood floors.

Hendersonville Public Schools

IT'S APPLIED WITH A MOP

Saves Time, Labor, and Floors

Write for Particulars

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Warehouses in Los Angeles, Columbus, and New York

You Receive Full Value When You Buy

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THE FLAGS THAT GIVE SERVICE

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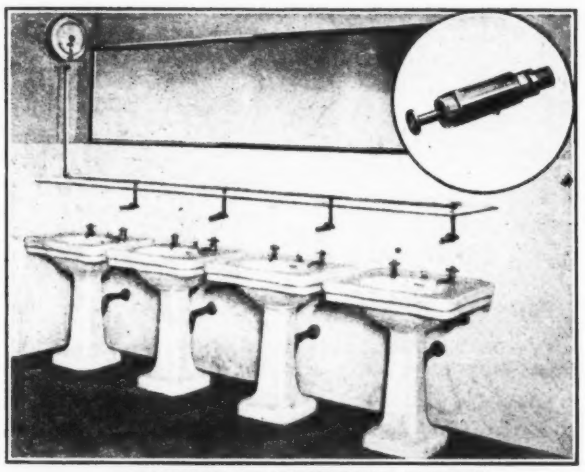
FEDERAL, STATE and MUNICIPAL GOVERNMENTS use more flags made of STERLING and DEFIANCE buntings than all other brands combined.

PERFECT HYGIENE *versus* DISEASE BREEDING METHODS



SOAPERIOR GRAVITY SOAP SYSTEM

Modern educators realize the vital importance of instilling the principles of cleanliness and hygiene in the minds of children—and thus laying the foundation for sound moral character.

The **SOAPERIOR GRAVITY SOAP SYSTEM** has been designed to replace the unsanitary use of cake soap in school lavatories. With this modern method—it is no longer necessary for many children to use the same bar of soap—spreading skin and eye diseases!

For the utmost in sanitation—select a modern Liquid Soap Dispensing System for the lavatories. Eminent engineers and architects agree that **SOAPERIOR SYSTEMS**—the **original** and **pioneer**—are trouble- and fool-proof and built to withstand hard usage. Suitable for both wash basins and showers.

Let us prove by actual figures that a **SOAPERIOR SOAP SYSTEM** is economical and highly practicable. An inquiry will bring some very interesting data.

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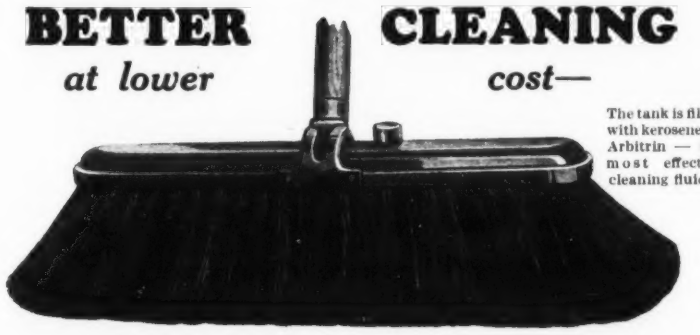
SOAPERIOR SOAP SYSTEM

BETTER CLEANING

at lower cost—



The tank is filled with kerosene or Arbitrin — the most effective cleaning fluid.

WITH THE MILWAUKEE DUSTLESS BRUSH METHOD

TO SCHOOL SUPERINTENDENTS:

Here is a sweeping system which will cut your yearly cleaning bill in half. It does away with sweeping compounds, oils and mops—and the MILWAUKEE DUSTLESS BRUSH COSTS NO MORE THAN THE ORDINARY BRUSH!

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No other sweeping brush will clean around desks with the ease, thoroughness, and speed of the MILWAUKEE DUSTLESS BRUSH. The handle is adjustable to your sweeping stroke.

We shall be glad to send you our special proposition to schools upon receipt of this blank.

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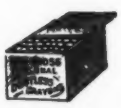

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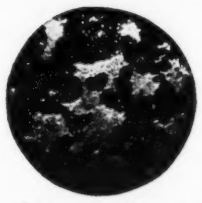

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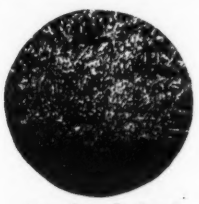

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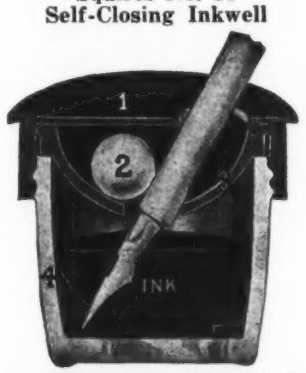

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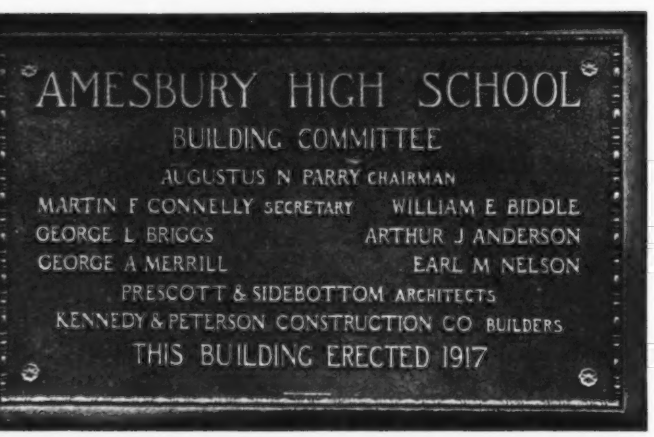

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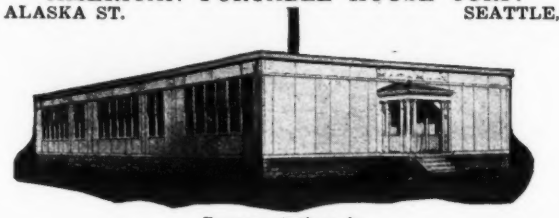

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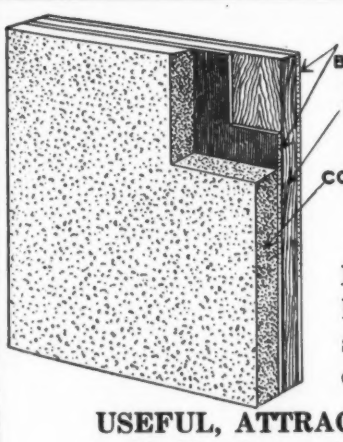

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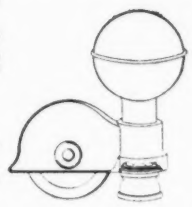

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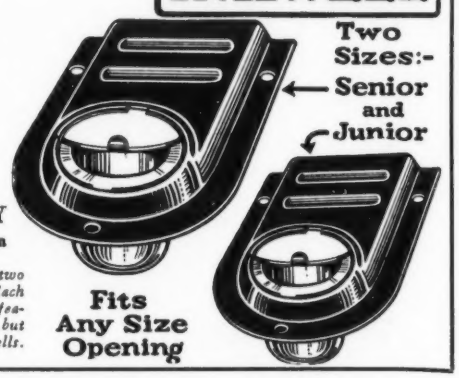

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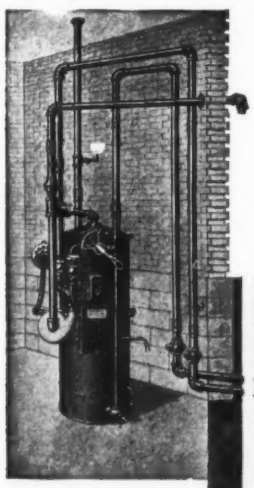

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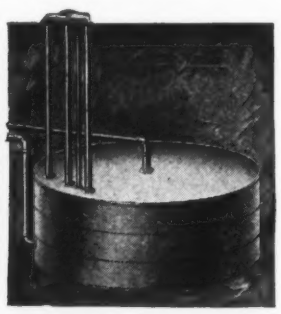

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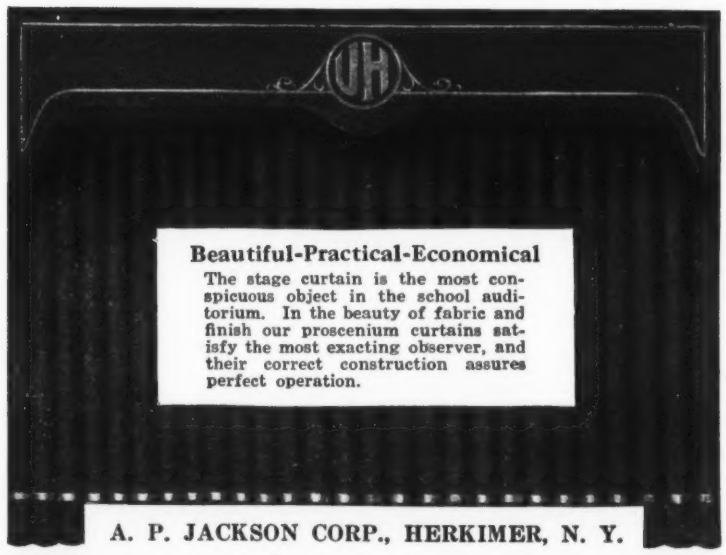
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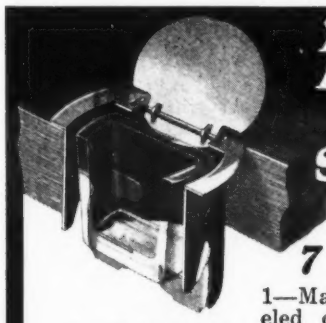

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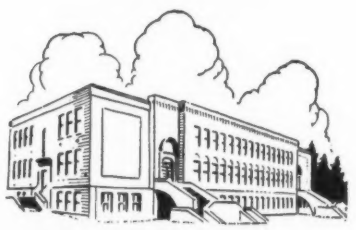

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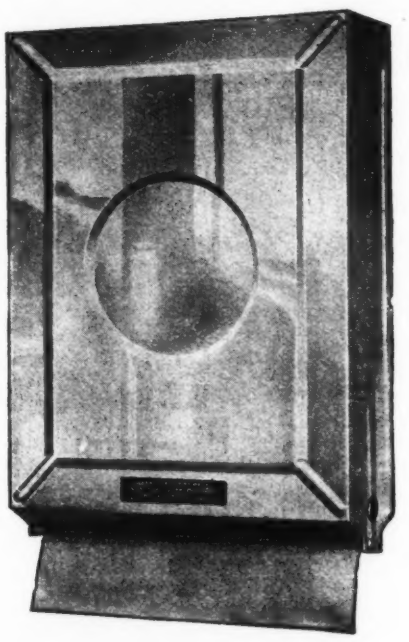

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(Continued on Page 209)

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(Continued from Page 207)

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Logan Co. (Formerly Dow Co.)
Stewart Iron Works Co., The

WOODWORKING MACHINERY
Buffalo Forge Company
Wallace & Co., J. D.

ADVERTISERS' REFERENCE INDEX

	Page
Acme Partition Company	194
Acme Scenic Studios	204
Adam Electric Company, Frank	192
A. P. W. Paper Company	3rd Cover
Alberene Stone Company	15
Algoma Wood Products Co.	32
All-Steel-Equip Company	122
American Abrasive Metals Co.	113
American Blower Company	142
American Blue Stone Company	131
American Boiler Mfrs. Assn., The	9
American Book Company	186
American Crayon Company	201
American Fence Const. Co.	195
American Laundry Machy. Co.	159
American Portable House Co.	202
American Seating Company	22 & 23
Anchor Post Fence Company	173
Annin & Co.	199
Arlington Seating Company	26
Armstrong Company, The	202
Asbestos Buildings Co.	146
Associated Business Papers, Inc.	191
Athey Company	13
Austral Window Company	4th Cover
Badger Wire & Iron Works	198
Bay West Paper Company	175
Beacon Steel Furniture Co.	33
Beardslee Chandelier Mfg. Co.	94
Beaton & Cadwell Mfg. Co., The	190
Beaver Products Co., Inc., The	172
Beck & Sons Co., The Wm.	200
Berger Mfg. Company	129
Bicfeld & Company, Otto	202
Binney & Smith Company	168
Blair Company, J. C.	189
Blickman, Inc., S.	196
Bonded Floors Co., Inc.	95
Bradley Wash Fountain Co.	196
Brown Company	206
Buckeye Blower Co.	4
Buffalo Forge Company	144
Cabot, Inc., Samuel	178
Cannon Printing Company	200
Celotex Company, The	114 and 115
Century Brass Works, Inc.	197
Chicago Gymnasium Equip. Co.	194
Christiansen, C.	180
Church Mfg. Co., C. F.	153
Circle A Products Corp.	212
Clarin Manufacturing Co.	181
Clarke Sanding Machine Co.	138
Cleveland Range Company, The	195
Clow & Sons, James B.	149
Colt's Pat. Fire Arms Mfg. Co.	197
Columbia Mills, Inc.	7
Columbia School Supply Co.	27
Continental Chemical Corp.	199
Copper & Brass Research Ass'n.	100
Cram Company, The George F.	200
Cyclone Fence Company	127
Dayton Safety Ladder Co., The	170
Denver Fire Clay Company	177
Derby & Company, Inc., P.	24
Detroit Steel Products Co.	97
DeVilbiss Mfg. Company, The	196
Dougherty & Sons, Inc., W. F.	197
Draper Shade Co., Luther O.	192
Dudley Lock Corporation, The	179
Dunham Company, C. A.	150
Du Pont de Nemours & Co., E. I.	106 & 179
Durabilt Steel Locker Co.	161
Duraflex Company, The	117
Durand Steel Locker Co.	104
Esterbrook Pen Company	201
Evans, W. L.	188
Finnell System, Inc.	183
Frost Mfg. Company, The	150
Gillis & Geoghegan, The	147
Globe Ventilator Co.	143
Glynn-Johnson Corporation	195
Goes Lithographing Company	200
Gregg Publishing Company	184
Gunn Furniture Company	34
Hamlin, Irving	180
Hammett Company, J. L.	35
Hartshorn Company, Stewart	170
Heywood-Wakefield Co.	167
Hill Standard Company	173
Hockaday, Inc.	157
Hoffmann & Billings Mfg. Co.	190
Holden Patent Book Cover Co.	135
Holmes Projector Company	192
Holophane Glass Company	99
Holtzer-Cabot Electric Co.	20
Houghton, Mifflin Company	186
Huntington Laboratories, Inc., The	158
Imperial Desk Company	24
Indiana Limestone Co.	102 & 103
Invincible Vacuum Cleaner Mfg. Co.	132
Iroquois Publishing Co.	187
Jackson Corp., A. P.	204
Johnson Service Company	2
Kansas City Scenic Company	202
Kayline Company, The	111
Kewanee Boiler Co.	3
Kewaunee Mfg. Company	163
Keystone View Company	202
K-M Supply Company	151 & 171
Knott Apparatus Co., L. E.	162
Kundtz Company, The Theodor.	25
Laidlaw Brothers	184
Landis Eng. & Mfg. Co.	174
Lee Lash Studios	194
Leitz, Inc., E.	188
Litterer Bros. Mfg. Co.	155
Little, Brown & Company	200
Logan Company	182
Lupton's Sons Co., David	107
McNear & Company, C. W.	125
Manufacturers Glass Co.	17
Maple City Stamping Company	28
Maple Flooring Mfrs. Assn.	211
Marble Chair Co., The B. L.	164
Matthews Gas Machine Co.	204
Medart Mfg. Company, Fred	133
Midland Chemical Laboratories, Inc.	11
Miller Keyless Lock Co., The J. B.	204
Miller Company, The	16
Milwaukee Corrugating Co.	128
Milwaukee Dustless Brush Co.	199
Mitchell Mfg. Co.	176 & 183
Murdock Mfg. & Sup. Co., The	193
Narragansett Machine Co.	193
Nash Engineering Co.	36
Natl. Assn. of Marble Dealers	112
National Crayon Company	200
National Paper Products Co.	10
National School Equip. Co.	31
National Super Service Co., The	175
National Vulcanized Fibre Co.	201
Natural Slate Blackboard Co.	1
Nelson Corp., The Herman	141 & 182
Nelson Mfg. Co., N. O.	152 & 204
Never-Split Seat Company	158
N. Y. Silicate Book Slate Co.	204
Norton Company	96
Norton Door Closer Co.	118
Novelty Scenic Studios	192
Oak Flooring Bureau	12
Oakite Products, Inc.	126
Pacific Steel Boiler Corp. of Ill.	5
Page Fence & Wire Prod. Ass'n.	193
Palmer Company, The	193
Paradise Playground Equip. Co.	183
Pathe Exchange, Inc.	187
Peabody School Furniture Co.	28
Peerless Unit Vent. Co., Inc.	123
Pa. Structural Slate Co.	178
Permalium Products Co., The	197
Peterson & Co., Leonard	165
Potter Manufacturing Corp.	195
Premier Engraving Co.	198
Rand, McNally & Company	184
Readsboro Chair Company	32
Reischmann Chair Co.	32
Richards-Wilcox Mfg. Co.	124
Rinehimer Bros. Mfg. Co.	34
Rowles Company, E. W. A.	30
Royal Metal Mfg. Company	34
Rundle-Spence Mfg. Co.	140
Russell & Sons Co., Albert	202
Safety Stair Tread Co., The	121
Sani Products Company	164
Sanymetal Products Company	154
Sargent & Company	12
Scientific Seating, Inc.	202
Shade Service Bureau, The	110
Sheldon & Company, E. H.	166
Society for Visual Ed., Inc.	188
Solar-Sturges Mfg. Co.	156
Sonneborn Sons, L.	14
Spencer Lens Company	187
Spencer Turbine Company	8
Squires Inkwell Company	201
Standard Blackboard Co.	203
Standard Conveyor Company	197
Standard Electric Time Co., The	38
Standard Gas Equipment Corp.	93
Standard Mfg. Co., The	30
Standard School Equipment Co.	26
Steele Mfg. Co., Oliver C.	204
Steel Furniture Co.	203
Steffens-Amberg Company	120
Stewart Iron Works Co., The	176
Sturtevant Company, B. F.	145
Tannewitz Works, The	205
Taylor Company, Halsey W.	148
Tiffin Scenic Studios	202
Togan-Stiles Company	134
Truscon Steel Company	105
Twin City Scenic Company	196
Underwood Typewriter Co.	169
U. S. Gutta Percha Paint Co.	137
U. S. Inkwell Company	204
United States Quarry Tile Co.	119
U. S. Sanitary Specialties Corp.	199
Universal Scenic Studio, Inc.	198
Universal Window Company	98
Van Range Company, John	21
Vitaglass Corporation	109
Vitrolite Company	108
Vogel Co., Joseph A.	2nd Cover
Vonnegut Hardware Company	6
Vortex Mfg. Company	139
Wallace & Tiernan, Inc.	20
Wallace & Company, J. D.	180
Walraven Book Cover Co., A. T.	185
Ward-Stilson Company, The	180
Wark, William H.	32 & 33
Wayne Iron Works	194
Weber Costello Company	29
Weis Mfg. Company, Henry	14
Williams Pivot Sash Co., The	16
Wilson Corp., Jas. G.	116
Winston Co., The John C.	184

BUYERS NEWS

CHANGE NAME OF FIRM

The Triple Metals Corporation, manufacturers of the Dudley keyless locks, has announced that the name of the corporation has been changed to the Dudley Lock Corporation, with offices at 107 North Wacker Drive, Chicago, Ill. The change in the corporate name affects in no way the organization of the firm's personnel, but it identifies the trade name more closely with the firm's product, Dudley keyless locks.

The Dudley Corporation will have an exhibit of its products in Booth 181 at the Boston convention of the department of superintendence. The exhibit will show the development of a new idea in display mechanics, which should prove novel as well as attractive and artistic.

Kewaunee Mfg. Company Increases Its Capital Stock

The Kewaunee Mfg. Company of Kewaunee, Wis., has increased its capital stock from $900,000 to $1,800,000. The increase in the stock is entirely due to the growth of the business and the necessity of gradually increasing factory space.

The Kewaunee Mfg. Company is the largest concern in the country engaged in the manufacture of laboratory furniture for schools, colleges, hospitals, medical schools, and industry. The special plant of the firm at Adrian, Mich., is engaged in the manufacture of manual-training benches, cabinets and other equipment for vocational departments of schools and colleges.

The growth in the laboratory furniture-department and in the shop-equipment department has necessitated four additions to the plant at Kewaunee and one addition to the plant at Adrian, and further large additions are now under way at both factories. While the firm employed 65 men in 1919, it now has on its payroll an average of 250 men at Kewaunee and 90 men at Adrian.

The management of the firm is in the hands of Mr. Charles J. Campbell, and branch offices are located in the various large cities.

MARBLE COMPANY TAKES OVER NON-COLLIDING CHAIR

It has been announced that The B. L. Marble Chair Company of Bedford, Ohio, has taken over all manufacturing and selling rights of the Law Noncolliding School Chair. It is their intention to sell this new and decidedly unique chair as a part of their established line of school seating which consists of tablet arm, chapel, and teachers' chairs, and stools.

A particular feature of the Law Noncolliding School Chair is an oscillatory and swiveling mechanism so designed as to absolutely prevent con-

THE NEW LAW NONCOLLIDING CHAIR.

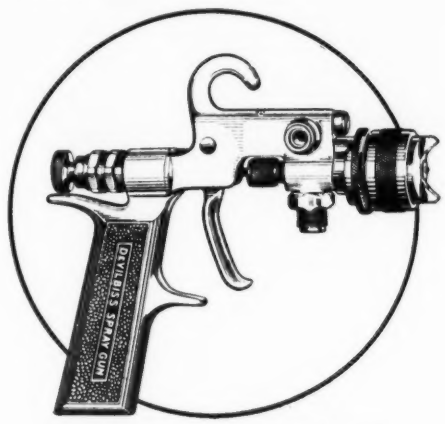
tact between the chair and the desk, no matter in what position the chair may be. The weight of the occupant is carried on the floor by a pedestal at the center of gravity. The chair is attached to the desk or table by an arm which is a part of the mechanism, and this arm is secured to the desk or table leg by four screws.

It has been found that this chair is most practical and efficient for teachers' use and for use in the classroom. Because of the fact that it has but one leg, the janitor's problem of sweeping is greatly simplified. It offers the added advantage of an orderly arrangement in the classroom, in that the chairs are always in alignment and cannot get out of place. There are many other advantages claimed for this new chair, all of which are very completely set forth in a pamphlet which will be mailed to school executives upon request.

The Law Noncolliding School Chair as well as other items of school seating will make up an exhibit of The B. L. Marble Chair Company at the coming convention of the National Education Association to be held in Mechanics Hall at Boston, February 25 to March 1. The originator of this chair, Mr. O. B. Law, will give demonstrations of the chair.

NEW DeVILBISS SPRAY GUN

The DeVilbiss Company of Toledo, Ohio, has announced the marketing of its Type AV improved spray gun for painting and varnishing, which is equipped with a spray head with graduated adjustment. The adjustment feature controls both the character and width of the fan spray and insures positive self-centering of the nozzle parts at all times. It maintains the proper balance between amount of the material used, the nature of work, and the speed of operation.



THE NEW DeVILBISS SPRAY GUN.

The distinctive advantages claimed for the Type AV gun are that it provides for advantageous application of any paint, varnish, or lacquer material on any kind of surface, and that it serves in full measure the finishing room, the automobile paint shop, and the general painting shop.

Information concerning the DeVilbiss AV spray gun may be obtained by writing to the DeVilbiss Company at Toledo, Ohio.

STEEL WINDOWS FOR SCHOOLS

The David Lupton's Sons Company, of Philadelphia, Pa., has issued its new Catalog P-50, showing the trend in the development and use of steel windows. The catalog offers complete information and charts of sizes for each window, and is of permanent reference value for school boards.

In line with the development in the manufacture of steel windows, the firm has announced the standardization of fifty sizes of three types of steel windows which are intended to fit a similar number of standard window openings. The three types are all of steel, with double-hung projected casements and side-projected casements. The three types are of the best design and manufacture and meet the present demand for a high-quality product. The advantages claimed for the standard types are that they make the design more elastic, offer greater freedom of expression for the architect and give the building owner better windows within the limit of his pocketbook.

The standard sizes of Lupton steel windows are available for use for standard openings with 6-in. variation from 3 to 5 ft. in width and from 4½ to 9 ft. in height. This range in sizes gives all the desired sizes for general use in all classes of buildings, except where special windows in lower or upper floors are used for architectural features. For small window openings, sizes 1½ to 2½ ft. in width and 2 to 5 ft. in height are available.

Complete information concerning the new standard steel openings for windows may be obtained by writing to the Lupton Company at 2205-d East Allegheny Ave., Philadelphia, Pa.

Sani Products Company Taken Over by Chicago Hardware Company

The Chicago Hardware Company of North Chicago, Ill., has taken over the Sani Products Company, which it will own and operate in the future. The change which became effective December 1, 1927, involves no change in sales policy.

The offices of the Company will be continued at North Chicago and the firm will continue to furnish equipment through its regular jobbing connections.

LIGHTING FOR SCHOOLS

The Holophane Company of New York City, has issued a valuable new booklet, entitled "The Lighting of Schools," which has been prepared as a guide for the architect, school-board member, and school administrator in choosing the proper lighting system for the various rooms in a school building. The pamphlet gives in simple and nontechnical form, the best principles and practice embodying the subject of school lighting.

The pamphlet offers illustrations of typical schoolroom interiors where the Holophane system is in use. It also gives valuable data showing the required number of foot candles for minimum illumination of work and approximate percentage of light reflected, based on various types of lighting equipment and the colors used for walls and ceilings.

The Holophane lighting system is known for its pleasing appearance, freedom from glare, and reasonable degree of illumination and its installation in any school insures ability to read easily and without glare in any part of the building.

Architects and school authorities who are interested in the subject of school lighting should address the Holophane Company at 342 Madison Ave., New York, N. Y.

OPEN TEACHERS' AGENCY IN MEMPHIS

The Southern Teachers' Agency has opened a college and specialists' bureau in Memphis, Tenn., with offices at 434 Goodwyn Institute Building. The bureau is an outgrowth of the college work which has been done in the last few years and is organized to meet the exacting demands of college executives in a more definite and helpful way.

The bureau will operate as a subsidiary of the Southern Teachers' Agency and will be under the direction of President W. H. Jones, and the local management of Mr. G. W. Cox.

Dunham Company Secures Patent on Differential Vacuum Heating System

The C. A. Dunham Company of Chicago, Ill., has announced that a patent has been obtained for their new Dunham differential vacuum heating system, an advertisement of which appears on page 142 of the January issue of this JOURNAL.

NEW KINDERGARTEN CHAIR

The Beacon Steel Furniture Co., of Chicago, Ill., has marketed a new hygienic kindergarten chair, which is designed to give correct posture and to assure comfort for the child. The chair is 13½ in. high, weighs only seven pounds, and is constructed

THE NEW BEACON KINDERGARTEN CHAIR.

of wood. It may be had in a variety of attractive colors, including Chinese red, Copenhagen blue, and apple green. It may be readily stacked for storage.

Complete information concerning this chair may be had by addressing the Beacon Company at 1410 South Wabash Ave., Chicago, Ill.

OBSERVES TENTH ANNIVERSARY

The U. S. Sanitary Specialties Corporation, Chicago, Ill., on January 1, observed the tenth anniversary of the establishment of the firm. The anniversary portrays the rapid and healthy growth of the company from the time of its inception to its present status as an institution of magnitude, with branch offices and representatives in every part of the country. Credit for the growth of the firm is attributed to Mr. Harold I. Koppelman, its president, who has had a vision of the possibilities of the business and who has directed the efforts of those associated with him in the promotion of the business.

The U. S. Sanitary Specialties Corpora is recognized as an outstanding leader in the sanitary specialties field. Beginning modestly in 1918 in a small factory at Loomis and 28th Streets, Chicago, the firm moved to another location on Fulton Street, where it occupied an entire building. Later the firm was again moved to a new five-story building which it now occupies. The firm is a pioneer in the invention and marketing of products used in the maintenance of sanitation and hygiene, particularly soap dispensers, air conditioners, and numerous chemical disinfectants and deodorants.

for
Cleanliness
Durability
Economy
Comfort
Efficiency

and for health
Floor *with* Maple

Few people assume a greater responsibility than those who build schools. The health and welfare of children and teachers—the economical use of public money—these are two ever-present problems that call for careful thought and sound judgment.

Because Maple, in the flooring field, solves both these problems so adequately it is outstandingly the choice for modern schools. Maple is warm, dry, resilient—reduces fatigue, "colds," absences. It is remarkably easy to keep clean, due to its tight-grained, tough-fibred texture and permanently smooth surface.

Maple will not sliver or splinter. It offers no open lodging places for dirt and germs. It will not develop ridges. Shuffling feet only make it smoother with time. Its amazing endurance makes it easily the most economical flooring for schoolroom use. Maple, moreover, provides an exceptionally fine anchorage for desks.

And Maple floors bring into the schoolroom the inviting, friendly atmosphere of the forest—the sort of inspiration to youthful minds that only natural surroundings can impart.

In classrooms, assembly halls, hallways, gymnasiums—in every section of the building where human health and lasting economy are combined factors, floor with Maple.

New!

Maple Floors in Color

By a scientific process recently developed, hard Maple Flooring is now made to take a variety of beautiful, lasting color finishes — opening up entirely new possibilities for attractive decorative effects. Standard finishes made only by the Marietta Paint & Color Co., Marietta, Ohio, as follows:

EARLY AMERICAN, SPANISH BROWN, AUTUMN BROWN, SILVER GRAY, DOVE GRAY, ROYAL BLUE, PASTEL GREEN, ORCHID, SEAL BLACK, NATURAL

Write for *free* booklet, "The New Color Enchantment in Hard Maple Floors."

Guaranteed Floorings

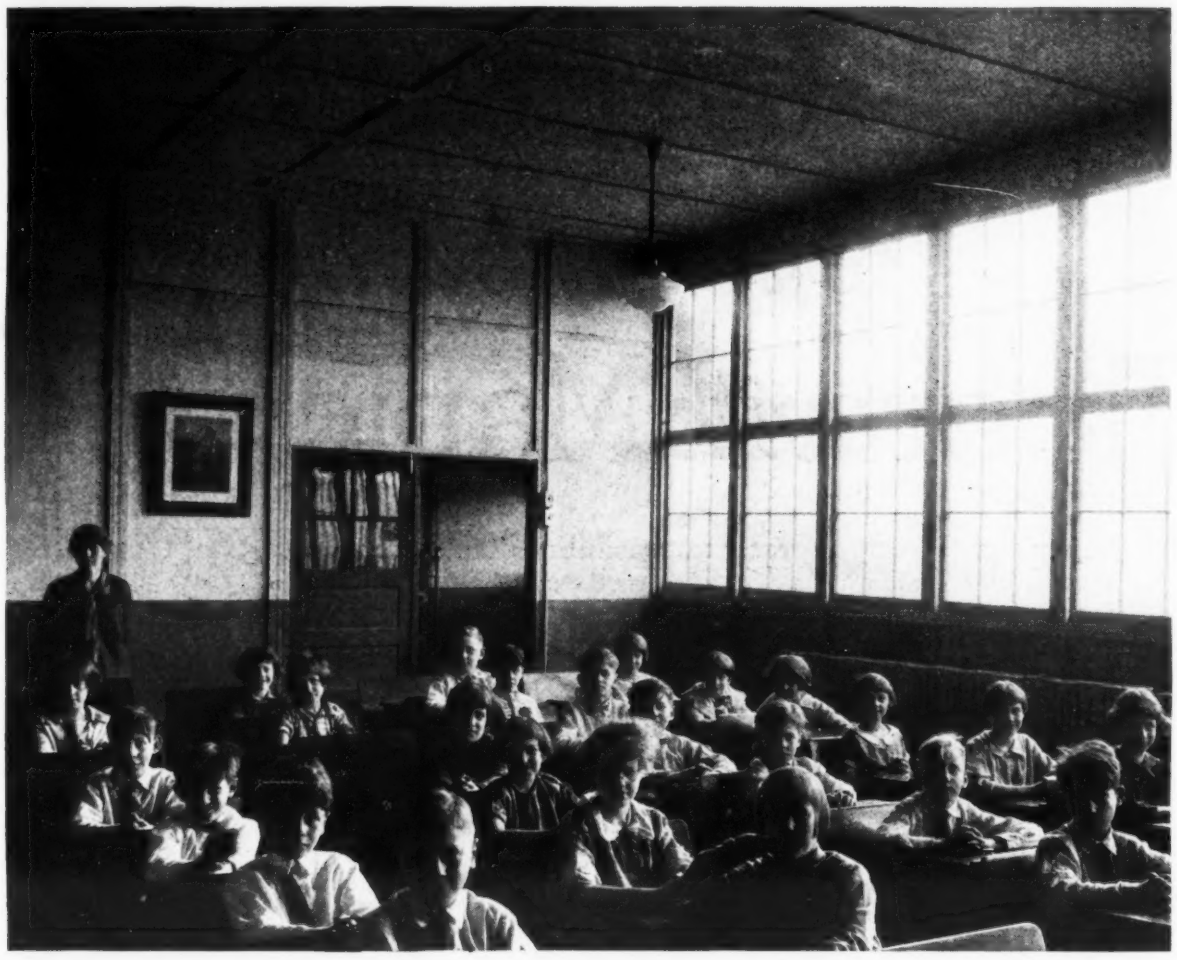
The letters **MFMA** on Maple, Beech or Birch flooring signify that the flooring is standardized and guaranteed by the Maple Flooring Manufacturers Association, whose members must attain and maintain the highest standards of manufacture and adhere to manufacturing and grading rules which economically conserve these remarkable woods. This trade-mark is for your protection. Look for it on the flooring you use. **MFMA**

Let our Service and Research Department assist you with your flooring problems. Write us.

MAPLE FLOORING MANUFACTURERS ASSN
1780 McCormick Building
Chicago

INSULATED

class rooms that are proof against prying winter winds



Easily erected in eight days

Circle A walls are four-layers thick. Real plaster, dead air space, wind and damp-proof membrane, and clear cedar siding, are four good reasons why Circle A class rooms are easy to heat.

With four men handling erection, classes can be put into session eight days after a Circle A School arrives.

Erected, Circle A Schools are ready to **stay up** for a quarter century, if desired. A reinforced "four-by-four" strengthens the walls at every three feet—a "six-by-six" at every corner. Indeed, Circle A Schools stand the years far better than most permanent buildings.

Light is perfect in Circle A class rooms. The air is fresh—yet draft-free. (Notice in the photograph above, how the windows stretch ceiling high, covering almost the entire left wall.)

Moreover, **Circle A Schools are priced within the reach of even very economical budgets.** Circle A Schools mean freedom from cramping, long-term bonds, that can burden the community for years to come.

CIRCLE A PRODUCTS CORPORATION
600 S. 25th STREET **NEWCASTLE, IND.**

The Answer to Over Crowded Class Rooms — and Budgets

Our book "Schools" is written by school building experts. Its sixteen interesting pages are filled with pictures, elevation drawings, and facts on school building. "Schools" shows you how to provide sturdy, healthful, weather-proof class rooms for very few of the community's dollars. There is no obligation in any way. This Coupon is for your convenience. Mail it today.

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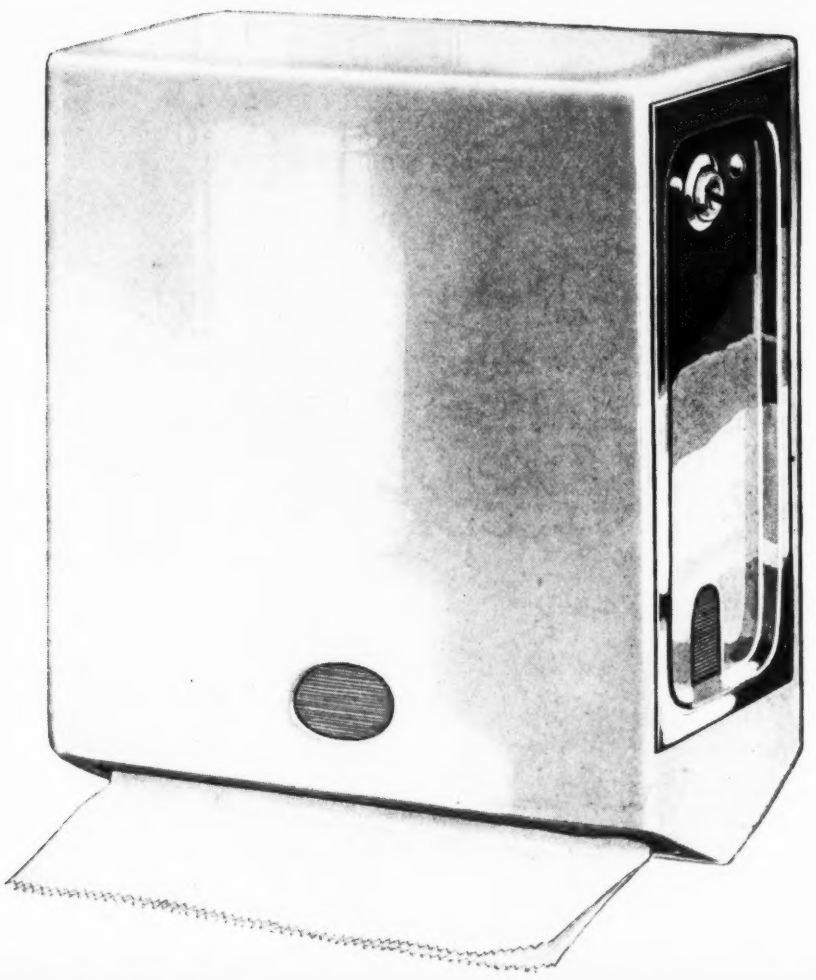
600 S. 25th Street, Newcastle, Ind.
Send me "Schools."

Name .....
Address .....
City..... State.....

CIRCLE (A) SCHOOLS

A. P. W. PAPER COMPANY, ALBANY, N.Y. U.S.A.



Onliwon toilet paper cabinet, in solid white porcelain, nickel-silver door with Yale lock to prevent theft of paper.

These Sturdy Cabinets Cut Down Waste

THE Onliwon system offers the utmost in toilet paper service at low cost, for four basic reasons:

Sturdy cabinets—carefully built, never out of order. Easy to refill, reducing servicing time.

Finer paper—soft, yet firm and absorbent. Fewer sheets suffice.

Economy—two interfolded sheets served at one time. No waste. Reducing greatly the actual amount of paper used.

Nationwide service—through our warehouses and distributors, permits prompt delivery.

A. P. W. Paper Company, Albany, New York, U. S. A.

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SUCH eminent names as Wm. B. Ittner, Tooker and Marsh, Guilbert and Betelle, M. W. Maloney, Coffin and Coffin, E. A. Christy, H. H. Turner, A. L. Harris, Joseph Llewellyn Co., and Perkins, Fellows & Hamilton are representative of the many architects who have standardized on Austral Windows for notable schools during past years.

¶ 1928 looms even bigger; $384,000,000 is a conservative figure for new school building this year.

¶ The Austral Window Co. is happy to serve architects and school officials in fullest capacity in this great school programme.

The Austral Window Co.

101 Park Avenue, New York